# COMPUTERWORLD

## THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

Weekly Newspaper

Second-class postage paid at Boston, Mass., and additional mailing offices

/year ©1974 by Computerworld, Inc. February 27, 1974 Vol. VIII, No. 9

NEWSPAPER


## NEWS IN BRIEF

### Special DPMA Unit Favors Joining Afips

PARK RIDGE, Ill. – A special study group of the Data Processing Management Association has recommended unanimously that DPMA join the American Federation of Information Processing Societies (Afips).

Details of the seven-member Afips study committee's recommendations were not released pending a meeting of the DPMA Executive Council on March 15 to study the matter, even though the final decision rests with the International Board of Directors, which will meet June 23.

### National Job Matching Plan Studied for Labor Department

WASHINGTON, D.C. – Plans for a nationwide, computerized job bank/matching system are being studied for the U.S. Department of Labor by a 15-member panel sponsored by the National Manpower Policy Task Force.

The new Comprehensive Employment and Training Act expressly calls on the Secretary of Labor to "establish and carry out a nationwide computerized job bank and matching system on a regional, state and local basis," noted Assistant Secretary of Labor William H. Kolberg.

In view of this act, the Labor Department has commissioned the panel to assess progress made thus far on plans for the system and to suggest additional developmental plans.

Under such a system, job openings

(Continued on Page 2)

★ CW ★
Special Report
Data Base
Management Systems
Follows Page 28

### On the Inside



# 'Interim' Privacy Rules Sought Under Justice Plan

By E. Drake Lundell Jr.
Of the CW Staff

WASHINGTON, D.C. – The Justice Department has proposed new "interim" regulations to protect individual privacy in criminal data banks and they would remain in effect until Congress acts on the privacy issue.

The proposed new regulations, which would go into effect within 90 days if there is not heavy opposition, are quite similar to those in the bill recently proposed by the department [CW, Feb. 20] and give individuals the right to inspect their records as well as limiting the use of such dossiers to criminal justice agencies.

**Proposals Outlined**

Under the interim measures individuals would have a right to inspect any data maintained on them by criminal justice agencies if the system had been funded with federal money – which covers almost every system in existence since they were primarily established with funds from the Law Enforcement Assistance Administration (LEAA).

Under the proposals the state and local operators of criminal data banks would also have to seal all records on an offender if that individual was not found guilty or if there was no disposition of the case after five years. However, there is no provision for sealing of FBI files.

The measures would also limit the use of such records solely to criminal justice agencies, thereby prohibiting their use by such departments as Defense and the Small Business Administration which have made extensive use of such records in the past.

They would also bar the dissemination of criminal records to private employers or credit agencies.

However, in cases where there was a specific state or federal statute permitting the use of such records for licensing or other purposes, such use would be permitted, the regulations said.

While the regulations would have the force of law when adopted, the only penalty for violators would be the cutoff of federal funds for the offending agency, without any criminal or civil sanctions for the agency or individual involved, as is the case in the proposed legislation introduced both by the Justice Department and Sen. Sam J. Ervin (D-N.C.).

The Justice Department has slated open hearings on the proposed regulations for Friday (March 1), and next Monday (March 5) with March 29 as the cutoff date for submission of written comments on the new regulations.

If the opposition is not too harsh, department officials said, the new regulations could go into effect by the beginning of April or May.

# DOS Support Service Set Up By Lessors Group

By Don Leavitt
Of the CW Staff

WASHINGTON, D.C. – Almost a year after IBM dropped DOS Release 26, the last one for the 360, to Class C maintenance (under which users have to pay for any work done by IBM), the Computer Lessors Association has brought back free support for at least some of the 360 user base.

In mid-February CLA began a DOS Support Service for installations that acquired their 360s from association member firms. The service includes a monthly

(Continued on Page 2)

# Police Voice Opposition

**WASHINGTON, D.C. – Opposition to proposed federal legislation protecting personal privacy in criminal offender data banks appears to be surfacing among the operators of such systems.**

**At a recent meeting of the National Crime Information Center Board, most of the talk dealt with picking apart the two bills and not with constructive measures aimed at improving them or establishing procedures to live up to the regulations, sources close to the meeting said.**

**In addition, it is known that several local police agencies are unhappy with the interim regulation proposed by the Justice Department (story on Page 2).**

**However, most of the opposition is being stifled since the objecting agencies apparently don't want to seem to oppose the issue of personal privacy – even though some public opposition can be expected in comments filed with the Justice Department on the new regulations.**

**Apparently most of the objections from police departments concern the timetables established for implementing the proposals, with several agencies expressing concern over their ability to follow the timetables.**

**In addition, another complaint is that the regulations – both the Justice Department interim measures and those proposed in the two privacy bills – will put a strain on the administration and operation of such data banks, making them more difficult to run for the police.**

**Several civil libertarians who have praised the Justice Department initiative in the area of privacy this year said last week that the evidence on**

*(Continued on Page 2)*

## Caravan Opens in Washington

# Congress Suffers From Data Gap: Ryan

By Vic Farmer
Of the CW Staff

WASHINGTON, D.C. – The recent Watergate scandal and the heavy focus on the accuracy of information supplied by the executive branch of the government has emphasized the need for separate information systems for the Congress, said Dr. Frank Ryan as he kicked off the

other coverage on Pages 4, 5, 12

Third Annual Computer Caravan here last week.

The Caravan, sponsored by *Computerworld*, moves on to Cincinnati this week and Houston next week as part of a 10-city national tour.

Attendance for the three-day stay here was estimated at approximately 3,000.

Speaking to nearly 200 forum attendees, Ryan, the director of the U.S. House of Representatives information systems, said the "legislative branch never before has been under the challenge it is under today.

"For a number of years now members

CW Photo by V.J. Farmer

**Dr. Frank Ryan addresses Caravan.**

of Congress have decried the information gap between these two branches of government.

"The executive branch has over 4,000 data porcessing units and the poor legislative branch only has four centers – one at the House, one at the Senate, one at the Library of Congress and one at the Government Printing Office.

"The reason the existence of the information gap is such a problem is that in the construction of our government, it was felt that these branches would be equal and there would be a system of checks and balances to keep each one of the branches in line.

"But today they are uneven. The executive branch for very good and natural reasons has achieved a really dominant position in the handling of information – not only information important to the executive agencies, but information important to Congress.

"You can imagine the problem that must occur when a congressional committee is called on to review the work of a particular executive agency and the only information supplied to the legislature is information produced on computers under the agency's control.

*(Continued on Page 2)*

# First Leg of Datran Digital Link Welcomes 4 Users

By Ronald A. Frank
Of the CW Staff

DALLAS – A teleprocessing user who is transmitting data at 2,400 bit/sec between this city and Houston is believed to be one of the first to use an all-digital, commercially available intercity communications link in this country.

The user, Management Systems Corp., is accessing the first operational leg of Data Transmission Co.'s (Datran) nationwide network.

The Management Systems line between the two cities actually includes two analog and one digital segment. Data entered on a Trivex CRT in Houston is converted from digital to analog mode with a "customer interface" that includes a 2,400 bit/sec Paradyne modem. The analog signal is sent over a conventional 4-wire local loop supplied by Southwestern Bell to the Datran intercity terminal.

### Back to Digital

At the terminal the signal is translated to digital form for transmission to the Datran terminal in Dallas. From there the signal is again translated into analog form, sent over a Bell local loop and converted by another Paradyne modem into digital form for entry into a Memorex 1270 controller. From here it is entered into the Management Systems 360/50.

The first Datran segment became operational several weeks ago and four users are now on the system utilizing a total of eight circuits. By mid-March about 18 circuits will be operational, a Datran spokesman said. Speeds of 4,800 bit/sec and 9,600 bit/sec are also available on the first link.

Management Systems is a service bureau which is supplying the Datran circuit to one of its customers, American Wine and Importing Co. The wine company uses the Management Systems' 360 to manage its inventory and print out invoices at its Houston office.

American Wine operates a wholesale/sales application that has a "very critical time frame on delivering invoices," according to Homer C. Wolfe, vice-president of Management Systems. When an order is entered on the Trivex CRT in Houston, the inventory and accounts receivable files are updated in Houston on the 360. In addition, an "extended invoice" is printed out at the Houston office on a Memorex printer, Wolfe explained.

Management Systems began testing the Datran line in December and it became operational in the middle of January, Wolfe said. The installation of the Datran link was about the same as an average telephone installation with few problems, according to the user.

### 'Less Expensive'

Management Systems will not say specifically how the cost of its Dallas-to-Houston Datran link compares with more conventional lines from Southwestern Bell, but Wolfe does admit it is "less expensive."

But another of the initial Datran users, the Dallas Independent School District, was more precise. According to Herb Hanus, management information coordinator, the Datran facility has cut the school system's communications cost by one third while doubling the capacity.

Datran presently expects to complete construction from Dallas to St. Louis in March with the first customers operational in April. By August the firm expects to be serving users into Chicago. When the Chicago link becomes operational, Datran will probably begin to add switched digital service. Until then customers will be operating on point-to-point private-line facilities.

# DOS Support Service Set Up by Lessors Group

(Continued from Page 1)

newsletter, a telephone "hot line" and, if necessary, on-site systems engineering support. The service is being run for CLA by The Computer Software Co. (TCSC) from a "war room" in Richmond, Va.

This center includes a complete library of IBM manuals, copies of "all the Apars (reported bugs and fixes) ever issued by IBM" and personnel who have a working knowledge of the operating system, a company spokesman said.

DOS is a stable system, he added, and IBM's DOS Release 26.2, which became available last September, takes care of many of the problems found in earlier releases. In any case, both TCSC and IBM seem to agree that 26.2 will be the last update of DOS/360.

The DOS Support Service team urges all DOS/360 users – whether under the CLA umbrella or not – to get that final release.

"But just ask IBM to send it to you, don't have 'your friendly systems engineer' bring it out from the branch office," an observer remarked. "If he brings it out, it'll cost you $37.50/hr – or whatever the going rate is – as long as he's on your call."

Neither CLA nor TCSC is ready to predict how much the new service will be used. Most DOS users have learned how to cope with the idiosyncrasies of the parts of the system they have been using heavily ever since they got their machines.

### One Step Beyond

But these same users – now that they have that base of knowledge under them – are moving more and more into parts of the system they haven't used before. And problems can arise from some explorations.

The problems occur as much from operators' unfamiliarity with new requirements as from serious coding errors within the control software. Most of the bugs within DOS have been caught, TCSC noted, but the IBM manuals are still hard to understand.

If users are operating with any release other than 26.2, they may not have applied all the Apars, particularly in those parts of the systems they weren't using when the fixes were published. This is basically why TCSC has the complete list of Apars – a user's problem may have been solved before he even reports it.

However, TCSC is also initiating its own bug-reporting-and-fixing system so that problems unresolved by IBM will be on record at the "war room."

Many of the software vendors marketing DOS enhancement packages also maintain libraries of the Apars that apply to the parts of the system interfaced. And most of these vendors share their knowledge of the system, and the Apars, with their users.

Members of CLA include the Computer Leasing Co.; Continental Computer Associates; DPF, Inc.; Dearborn Computer Leasing Corp.; Diebold Computer Leasing Corp.; Granite Computer Leasing Corp.; Greyhound Computer Corp.; Itel Corp.; National Computer Rental; Talcott Computer Leasing Corp.; and Dier Computer Corp.

# 'Data Gap Plagues Congress'

(Continued from Page 1)

"There's just built into the situation right now a distortion of what was meant when our government was conceived," he said.

Ryan advocated that the legislature must have independent sources of information and suggested the best plan would be an independent, nonpartisan information systems branch in the government.

One of the major roadblocks to the legislature making great use of the potential of data processing is the very organization and philosophies of the legislature. While the House has placed data processing under a one-man responsibility, the Senate splits its DP functions under two senators. In addition, the legislature is "terribly" cost-conscious. "That means that when you do something that costs money, they want to see some results.

"And you must all know from your experiences in the computer industry that it's not so much a cost reduction that is brought about through information systems as it is the increase of facilities and services.

"So we have to show Congress that a service which might cost Congress $500,000 really means that this service is going to reduce costs by, say, $200,000, and this might make the information systems a little more palatable," he added.

But Ryan, former football star for the Cleveland Browns and the Washington Redskins, does have a game plan to educate the legislature to accept the heavy expenditures information systems require to set up.

The strategy he has followed over the past three years at the House is to attack easy information processes and to systematize them in a way that would give obvious proven results, such as the automated voting system on the floor, status accounting for bills and legislation and text-processing systems so committees can use it to prepare their calendars.

"These systems have in their own way proven to Congress and are proving to the legislators that there is a place for information systems technology in the Congress," he claimed.

# Job Bank Under Study

(Continued from Page 1)

would be listed daily by computers in Employment Service Offices and matched with job seekers whose skills, attitudes and experience would also be stored in the system.

Experimental work has been under way for several years to develop workable job-worker matching methods for use by the Federal-State Employment Service system, according to Kolberg.

Job banks have been established in 40 states, and 10 states use experimental job-matching systems now, he added.

The panel, including economists, computer system authorities, industrial psychologists and specialists on job-worker matching, will provide a final report to the Manpower Administration within three months.

# Nixon Proposals For Review on Way?

WASHINGTON, D.C. – President Nixon is reportedly ready to send his proposals for a Cabinet-level review of the privacy question to Congress this week or next, sources here said last week.

At the same time, there is reportedly a great deal of infighting among the different agencies over who will actually oversee review.

It is believed the Department of Justice has been ruled out as the agency to run the program, but is still fighting to be placed in charge of the effort. The best bet now is that the review will fall under the responsibility of the Office of Telecommunications Policy in the White House.

The program itself is also coming under attack as an "unnecessary waste" on the part of some civil libertarians.

"After all," one said last week, "there have been several excellent studies in this area, including the HEW Committee last year. Now is not the time for another study, but rather for action."

# Bills Are Opposed

(Continued from Page 1)

nonsupport from police departments was "disturbing."

"After all, these are the guys that control the data banks and their cooperation will be needed to make sure that any regulations are effective," one said.

"If they decide not to go along or to drag their feet in implementation, it could hurt the whole program no matter how strong the law is," he added.

The police agencies are not the only ones who have doubts about the new regulations, with both the Department of Defense and the Small Business Administration reportedly ready to argue against the plans since they would be denied criminal offender information under the proposed regulations.

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY
TM Reg. U.S. Pat. Off.

DR. H.R.J. GROSCH, *editorial director*
EDWARD J. BRIDE, *editor*

RONALD A. FRANK, *associate editor, technical news.* E. DRAKE LUNDELL JR., *associate editor, general news* and *computer industry.* MARVIN ARONSON, *editorial production chief.* V.J. FARMER, *systems editor.* DONALD LEAVITT, *software editor.* MARY UPTON, *financial editor* and *assistant computer industry editor.* LESLIE FLANAGAN, *photography editor.* JUDITH KRAMER, *copy editor.* PATRICK G. WARD, TONI WISEMAN, MARGUERITE Y. ZIENTARA, *staff writers.*

MARVIN SMALHEISER, *West Coast bureau.* J.H. BONNETT, *European bureau.* HIDETSUNA SASAKI, *Asian bureau.*

CONTRIBUTORS: J. DANIEL COUGER, *education column;* ALAN TAYLOR, *Taylor Report* and *professional practices.*

NEAL WILDER, *vice president – marketing.* DOROTHY TRAVIS, *sales administrator.* JUDY MILFORD, *advertising coordinator.* KATHRYN V. DINNEEN, *market research.*

LEETE DOTY, *production manager.* HENRY FLING, *production supervisor.*

W. WALTER BOYD, *publication manager.* PATRICK J. McGOVERN, *publisher.*

EDITORIAL OFFICES: 797 Washington St., Newton, Mass. 02160. Phone: (617) 965-5800. Telex: 92-2529. Los Angeles: 963 N. Edgecliffe Drive, Los Angeles, Calif. 90026. Phone: (213) 665-6008. Europe: Computerworld, c/o IDC Europa, Ltd., 140-146 Camden Street, London NW19 PF, England. Phone: (01) 458-2248/9. Asia: Computerworld, c/o Dempa/Computerworld Company, Dempa Building, 1-11-15, Higashi Gotanda 1-chome, Shinagawa-ku, Tokyo 141. Phone: (03) 445-6101. Telex: 26792.

Second-class postage paid at Boston, Mass., and additional mailing offices. Published weekly (except: a single combined issue for the last week in December and the first week in January) by Computerworld, Inc., 797 Washington St., Newton, Mass. 02160. 

50 cents a copy; $12 a year in the U.S.; $13 a year in Canada; all other foreign, $36 a year. MARGARET PHELAN, *circulation manager.* Four weeks' notice required for change of address. Address all subscription correspondence to circulation manager, Computerworld, 797 Washington St., Newton, Mass. 02160



*Computerworld* can be purchased on 35mm microfilm in half-volumes (six-month periods) through University Microfilm, Periodical Entry Dept., 300 Zeeb Rd., Ann Arbor, Mich. 48106. Phone: (313) 761-4700. ae

COMPUTERWORLD, INC.

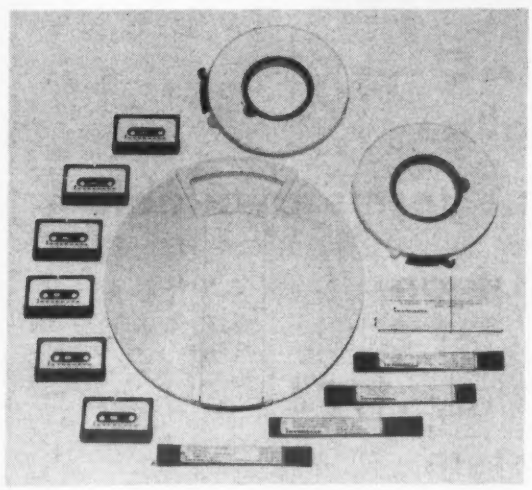
Patrick J. McGovern ..... *president*
W. Walter Boyd ..... *executive vice president*
Robert M. Patterson ..... *vice president–int'l.*
T. Neal Wilder ..... *vice president–marketing*

BPA ☆ABP AIA

POSTMASTER: Send Form 3579 (Change of Address) to Computerworld Circulation Dept., 797 Washington St., Newton, Mass. 02160.

# INTERDATA ANNOUNCES A KICK IN THE TEETH FOR SOFTWARE SKEPTICS.

## SIX NEW SOFTWARE PACKAGES FOR THE INDUSTRY'S FIRST 32-BIT MINICOMPUTER LINE.



First came our new 32-bit 7/32 minicomputer. Up to a million bytes of directly addressable memory. Under $10,000.

And the new 16-bit 7/16. PDP-11 performance at a Nova 2 price.

Now for the skeptics who think minicomputers never have powerful software:

Six new software packages that let you do all the things the hardware was designed to do.

| | |
|---|---|
| OS/32 MT | A super-fast real-time operating system with a file handler to optimize storage utilization or access time. A multi-programming, multi-tasking scheduler that finds the place for your programs instead of making you worry about it. |
| OS/32 ST | An easy-to-use, comprehensive 32-bit program development oriented operating system that takes only 32K bytes of memory. |
| OS/16 MT | A small—as little as 4K bytes—operating system with multi-programming and multi-tasking capability, ISA real-time FORTRAN extensions, and all the capabilities you need to cut the cost of implementing your system. |
| FORTRAN V | Full FORTRAN V capabilities, yet requires only 24K bytes compared to other piggish 56K-byte FORTRAN V systems. |
| Multi-User Extended Basic | A low-cost, powerful multi-user system utilizing Extended Basic language that can support 4 users with less than $10,000 of hardware. Can be expanded to support 32 users. |
| Utilities | A raft of utility software, including CAL, an assembler that optimizes your 16- or 32-bit code; EDIT, our new text editing package that simplifies maintenance of source files; OS Aids, new inter-active debugging package that finds your program errors quickly and easily. |

Getting Interdata software is easy. We don't hamstring you with high prices or a restricting license deal. We sell it for a reasonable price and then back it up.

It's all available on our own cassettes, too. Simple. Convenient. Compact. The way you need it.

Best of all, we've gone to great lengths to do something nobody else has ever done—protect your software investment. Any software package you buy to run on one Interdata processor has been designed to run on any larger Interdata processor as well.

So don't spend a fortune on software only to watch it go up in smoke two years from now. At Interdata, we worry about your software when we're designing our hardware.

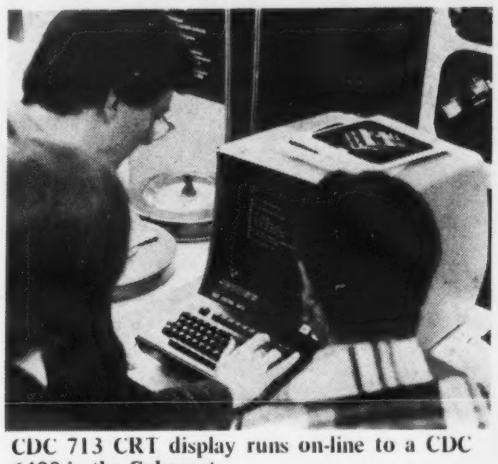
That's something even a skeptic can get excited about.

**INTERDATA®**

2 Crescent Place, Oceanport, New Jersey 07757 (201) 229-4040.
New York – (201) 947-2200. Boston – (617) 890-0557. Washington – (703) 525-4806.
Pittsburgh (412) 941-5738. Philadelphia – (215) 436-5579. Orlando – (305) 851-6962.
Chicago – (312) 437-5120. Detroit – (313) 356-5515. Dayton – (513) 434-4193.
Kansas City – (913) 384-1606. Houston – (713) 783-3060. Dallas – (214) 238-9656.
Denver – (303) 758-0474. Los Angeles – (213) 640-0451. Phoenix – (602) 968-2477.
San Diego – (714) 565-0602. San Francisco – (408) 249-5540. Seattle (206) 455-0680.
Toronto – (416) 677-8990. Tokyo – (270) 7711. Sydney – 439-8400.
London – Uxbridge 52441. Munich – 0811-8543887.

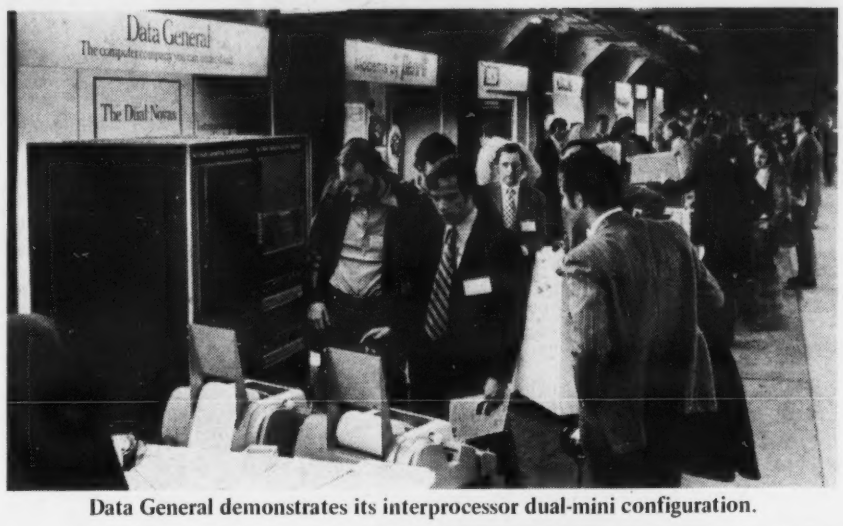
# Caravan/74: a Product(ive) Show

"You mean I can put up to eight floppy disks on this one Shugart controller?"

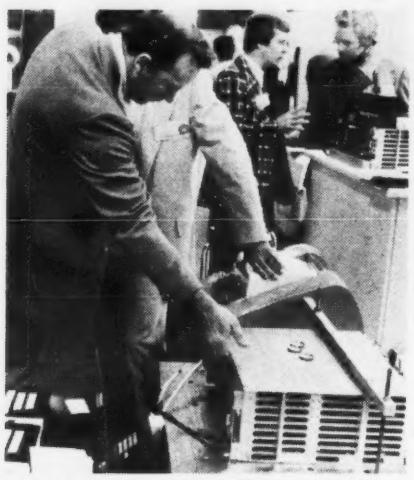


CDC 713 CRT display runs on-line to a CDC 6400 in the Cybernet.

Photo Feature by Vic Farmer




Data General demonstrates its interprocessor dual-mini configuration.



Interdata 716 mini vibrates at 1.5Gs on a test stand and still works.


Prime Computer simulates the ecology of the world on a Prime 300 with virtual memory.


General Computer Systems runs its key-to-disk 2100 system.

# 'Dumb' Terminals - Mini Link Praised at POS Session

By Toni Wiseman
Of the CW Staff

WASHINGTON, D.C. – Retailing is not the only industry being revolutionized by the advent of point-of-sale systems.

This was evident in the attendance at a Computer Caravan workshop on POS here in which the retailing industry was represented by only two firms.

The Department of Health, Education and Welfare, Project Hope, Norfolk Western Railroad, the Coast Guard and the City of Wilmington, Del., were only a few of the attendees who gathered to hear Samuel Finlay discuss his POS installation.

Finlay, of Woodward & Lothrop, said the use of minicomputers was the "breakthrough" in the POS business.

"The use of minis brought about the start of widespread acceptance of these systems in retailing," he noted.

While expressing his pleasure with his Regitel equipment, Finlay described the different aspects of other vendor systems, such as Singer, NCR, Unitote and Pitney-Bowes, pointing out the advantage of using "dumb" terminals on-line to a mini, rather than intelligent terminals as registers.

Both Singer and NCR have intelligent terminals going to minis which were being used as collectors affording the user little interactivity, he said.

Regitel, he said, then came up with a "dumb" terminal completely controlled by the controller mini. The system was therefore interactive.

"This is the way of the future," he said, noting that both NCR and Singer are now stressing interactivity in their systems, for added capability.

Woodward & Lothrop's entire POS

Caravan/74

system is hooked into minis, thereby freeing up CPU time, disk drives and other communications, he said.

"The switch to minis was directly cost-justifiable," he maintained.

One of the advantages of a dumb terminal, he said, is that its purpose can be extended to other applications, such as time-clocking, general inquiry, physical inventory and receiving and shipping control.

The conversion to an industry standard OCR font is really not posing too much of a problem, he said. "The terminal will read the tag printed in OCR font, or if it's a Kimball ticket, the operator will simply tear off the ticket for later processing," he said.

## Bank Switches, Saves With Key-Disk

WASHINGTON, D.C. – Changing his small data entry operation from key-punch to key-to-disk saved a net $400/mo, Roy Hendrix, vice-president of the National Bank of Washington told a Computer Caravan session on off-line key entry.

The bank had been using three IBM 129 buffered keypunches and replaced two of these with three Inforex key-to-disk systems. These are capable of batch balancing and full account number recognition and allowed dropping of an IBM 1260 document carrier and let the bank automate an extra application.

Since installation in August 1972, only one delay has occurred with the Inforex system, Hendrix stated. This was caused by a problem in the controller and resulted in lost data.

The data probably wouldn't have been lost, Hendrix noted, except that the supervisor was out sick and one of the operators was assuming his responsibility.

An attendee mentioned the risk of one controller handling eight stations.

The questioner, an Inforex user in a remote location, said that troubles with a controller had caused 24-hour downtimes on some occasions.

The Inforex units are being used for straight data entry simulating 80-column cards, Hendrix said. Inforex does not offer formatted capability, he mentioned.

Hendrix said he thought key-to-disk systems are only an interim step between keypunches and on-line systems for most DP users.

## One Big User Finds Intelligent Units Are Worth the Cost

WASHINGTON, D.C. – Can a high-priced intelligent terminal system being used for data entry be worth the cost?

It can – if users look at the "big picture," Barry Gorman, chief, personnel systems, Department of Justice, told a Computer Caravan session on intelligent terminals here.

The Justice Department has 50,000 employees in the U.S. and overseas and is using Sycor intelligent terminals from 46 locations in this country for employee personnel and payroll data entry and other applications.

The terminals were acquired in the fall of 1970, Gorman said, because they alone combined communications capability, edit capability and a CRT screen for viewing keyed-in data for errors.

The editing at the source made a tremendous difference in errors as soon as the intelligent terminals were installed, Gorman stated.

Previously the various Justice Department offices had mailed in source documents and a contractor did the keying.

The combination of errors and delays, especially with something as time-sensitive as payroll information, was a big problem, Gorman indicated.

Although the basic terminals cost $6,500, using them "allowed us to have accurate data and timely data," Gorman emphasized.

"We justify the cost on the system output," Gorman said, adding, how do you cost out a serious error?

## Increased Costs, Reduced Efficiency Cited

# Problems Seen With Calif. Privacy Bill

By a CW Staff Writer
*(related story on Page 32)*

SACRAMENTO, Calif. – An "automated personal data system" privacy bill, introduced in the 1973 California Legislative Session by Assemblyman William T. Bagley (R-San Rafael) [CW, Feb. 6], "would cause considerable problems for the department" of data processing concerning "a number of provisions," according to an analysis by Rob Quist, chief of the administrative services division of the Los Angeles County DP department.

The bill, called the Computer Crime Prevention Act of 1973, intends to:

- Impose safeguards, restrictions and other specified requirements upon the use and transfer of certain personal data used by computers in automated personal data systems.
- Make it a misdemeanor to fail to conform to certain requirements regarding supplying written notice of the described rights of persons to whom the data pertains.
- Require persons maintaining automated personal data systems to file annual notice with the department of consumer affairs specifying such things as the system's nature, purpose and intended use.

The Los Angeles County DP department objects to the privacy bill on the following counts:

- Obtaining the prior informed consent of individuals to whom personal data pertains would be a costly and difficult procedure and in the case of law enforcement data particularly, "would defeat the purpose of the transfer."
- It is impossible to discover, let alone record, the use made of data once it is accessed by persons outside of county government.
- Recording the identity of persons and organizations who seek access to data which is accessible to them by law may be a violation of the privacy of the persons seeking such access.
- Any number of judgments is possible regarding what constitutes "obsolete data" to be eliminated from files.
- It would be difficult to conform to individuals' requests of whether they are subjects of data files and to supply them with their data if the are. To conform would require the department to conduct lengthy searches of files and to modify its computer programs to allow such searches, then to print the data for the individual. "This would require massive additional computer, programmer, computer operator and clerical time with consequent increased costs of DP operations."

**Reduced Efficiency**

The department concluded that "the effect of this bill, if passed in its present form, would be to greatly increase the cost and reduce the efficiency of the county's DP operations by requiring major system modifications and significant increases in storage and computer processing time."

*"... the effect of this bill would be to greatly increase the cost and reduce the efficiency of the county's DP operations by requiring major system modifications..."*

The department found the bill would "penalize organizations wishing to take advantage of the benefits of automation, thus discouraging the desirable use of computers and depriving the public of the cost savings to be realized from computerization." The bill, according to the department, does not mention manual systems, thus allowing the possibility that "identical categories of information in different California counties would be subject to vastly different restrictions" depending on whether they were computerized or manual.

The bill is now before the Senate's Governmental Organization Committee. No date has been set for a hearing.

## Chemical Base Set

PHILADELPHIA – A data base is being built to aid researchers in identifying specific chemicals to which American workers are exposed.

The products will be chemically clarified, by mailing an ingredient request to the manufacturers, and the list of components will be entered into a computerized data base for research purposes.

The National Institute for Occupation Safety and Health has contracted with Auerbach Associates, Inc. for the 20-month study of up to 40,000 trade name products.

## Society Presidents Told

# Managers Wield Power to Help/Hinder Firm's Chiefs

By Patrick Ward
Of the CW Staff

NEW YORK – A data processing manager is in a unique position to help – or hinder – his firm's top executives, American Management Association President James L. Hayes told a meeting jointly sponsored here by the Metropolitan Chapter of the Association for Systems Management; the New York Chapter of DPMA; and the New York Chapter of Guidance.

There are many instances where DP has provided executives with information they never had before and did not realize they needed. And by using this data, executives in some cases soon recognized "how much better their decision-making was," Hayes observed.

On the other hand, Hayes countered, much of "the stuff that is coming out from computer installations is one of the greatest impediments to timely management" because it bogs down the executive and takes him away from dealing with people.

Some DP departments are putting out data that is more a demonstration of "how a computer can make a book than a control instrument," Hayes remarked.

Instead, the DP manager should tell executives: "If you'll tell me what's your problem, maybe I can get it to you in a better way."

The better way would report variance information only, Hayes indicated. "Those things that are on plan ought not to be called to the executive's attention," Hayes emphasized.

A criticism of DP has been that people have not been programming what is, but what should be, Hayes said, adding that DP managers often put young programmers into a position of making decisions "that we would never allow the man to make in real situations.

"Knowledge and good theory don't make a DP professional," Hayes continued, "and in very many cases what we're seeing today is the attempt to produce a skilled craftsman . . . who won't ever be a professional.

"For any one to be expert in his particular field and cease to broaden himself is a mistake," Hayes said. "Better to know a little bit about a lot so you can be sensitized to what people in other areas are looking for," he declared.

Turning to some points that management might be overlooking, Hayes said that DP staffs often prepare an information base to the liking of an influential individual, but this may not serve the needs of other top management team members.

Participation would help this situation, Hayes pointed out.

On long- and short-range planning: To many DP managers this means "implementing your short-range plans and filing your long-range ones," Hayes said. Instead, managers should have long- and short-range aspects of one plan.

On management by objectives: "The outstanding gimmick in many companies today that will probably fail within five years." Management by objectives can work with teams, but if it's oriented toward individuals, it tears the team apart.

On job descriptions: "Job descriptions are good provided one knows what it means – a job description does not tell a person what he does, but what he's accountable for."

The negative side of them is that people think that if they do those tasks, they're safe. This can also run counter to a person's professional growth by restricting him to a narrow part of the firm's DP effort, Hayes added.

## Joint Meeting Seen As Setting a Trend

NEW YORK – The joint meeting that three local society chapters held to hear AMA President James L. Hayes was a first that may mark the beginning of a trend, chapter presidents said.

In the same spirit, Hayes advocated confederation of national societies, during a round-table discussion with the three chapter presidents.

Hosting the joint meeting were Joan Knutson, president of the Metropolitan Chapter of the Association for Systems Management; Kurt W. Bruck, president of the New York Chapter of DPMA; and Amos White, president of the New York Chapter of Guidance.

"We're getting tremendous positive reaction that this is a thing of the future," Knutson said of the common meeting.

"We encourage it, too," said Bruck. "We are in one industry," he reasoned, but society members, working in a variety of different applications, have "individual interests . . . so diverse that it is hard to have a continual attendance of members at each meeting," Bruck remarked.

But would a universal group be best? A lot of professional societies can offer a lot of top posts, and these can be wonderful educational experiences to those who fill them, Knutson pointed out.

But organizations can have independence in their objectives, membership and other aspects, Hayes said, without foregoing all the privileges in joining with like associations.

Perhaps this would entail an umbrella organization on the national level that would be in a federal-to-states relationship with the major professional societies, he remarked.

Communication is the first step, with joint meetings between top staff officers once a year, Hayes suggested.

### Who Joins?

Some society members who are first and foremost hardware people, systems people and software people are just joining professional societies "because it looks good on their resume," Knutson commented.

Years ago when data processing was new, DPers were hungry to learn all sorts of information about the field, Bruck recalled. But now, DPers, like doctors, have gone from being generalists to specialists.

"All these people have a commonality plus their specialty," Hayes noted, but "systems men or programmers cannot become professionals by themselves. They have to be broadening their common base constantly."

The societies can be the means by which individuals in DP can try to keep current with the entire field and thus work toward professionalism, the society presidents agreed.

# Announcing Cubic. A computer tape you can lay money on.

It's easy to prove that new Cubic computer tape has twice the resistance to edge damage—the major reason for tape retirement.

Prove it yourself with a simple strength test, a structural analysis, or by the performance of Cubic in your data-processing system.

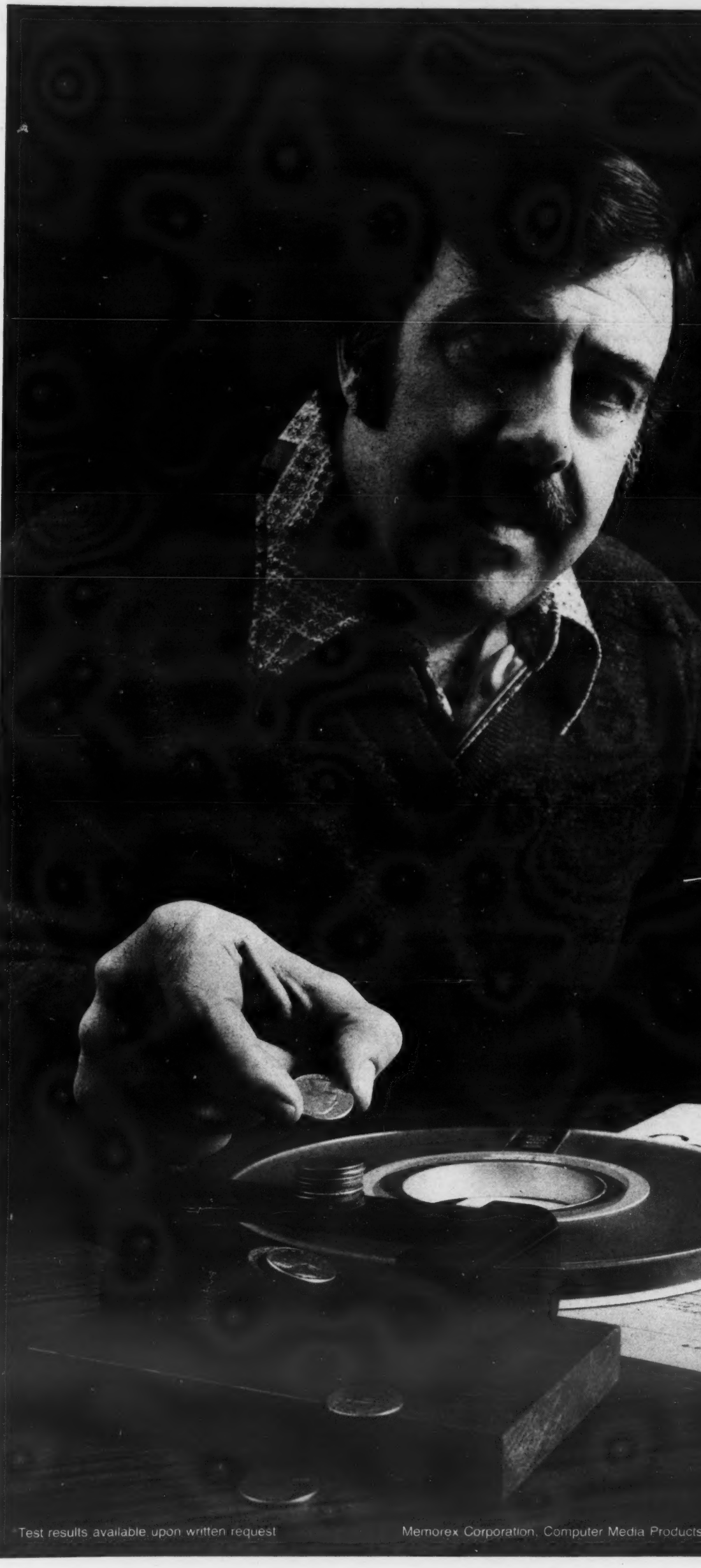
The test: Borrow a tape tester and a stack of quarters from a Memorex representative. Miniature beam balances measure the cross-sectional strength of two tapes. Cubic stands firm under the load of 2 to 3 times as many quarters as conventional tapes. If we aren't right, keep the money.

The analysis: A tape's side load properties increase with the cube of the base thickness and Cubic has the added strength of a 25% thicker base.

The performance: Cubic's edge strength does more than extend tape life. Cubic's extra rigidity makes it ideal for spanning gaps in auto-load transports. But in any transport, Cubic helps compensate for machine skew, improves start/stop operation, and gives more consistent readouts from the high performance, high density 9 track tape drives.

Of course Cubic conforms to industry performance standards and is certified for 6250 BPI. The difference is that Cubic is structurally engineered to meet those standards for a much longer time than conventional worktapes.

Memorex Corporation, Computer Media Products, 1125 Memorex Drive, MS-0064, Santa Clara, CA 95052



A personal message to all tape users and manufacturers:

"In the adjacent picture, I'm using a tape tester that's holding a strip of Memorex Cubic and a strip of a competitor's tape. The competitor's tape only had enough cross-sectional strength to hold 3 quarters. The Cubic is holding 7 quarters and I'm about to add the eighth.

"In an industry where true innovation is rare and technical advances are marginal, Cubic represents a concept and a product that is remarkably unique. It is a dramatic confirmation of our on-going committment to memory excellence.

"Cubic is a logical development by a company that manufactures both media and hardware. Only an organization that understands both Micro and Macro system requirements could create Cubic.

"This new concept reverses manufacturing trends and will provide users with the single largest deterent against errors and edge damage in the industry.

"We want to do what is best for our customers, our company and the computer industry. As such, we encourage our competition to introduce a similar tape based on the same physical principle as Cubic. Such introductions will benefit users regardless of the manufacturers from whom they buy."

Philippe Yaconelli

Philippe Yaconelli
Vice President, Marketing
Media Products

MEMOREX

Test results available upon written request

Memorex Corporation, Computer Media Products, 1125 Memorex Drive, MS-0064, Santa Clara, CA 95052

## Need to Be Systematic, Comprehensive

# 'Nothing More Than Cost-Effective Risk Management'

**DP security is a complex, interactive mix of physical, procedural and data protection, with a healthy amount of backup and audit.**

**This series gives an overall look at the security responsibilities of users and vendors, defines the threats to security and analyses in detail protective measures to minimize security risks.**

Assuming manufacturers are aware of needs for the inclusion of data protection within their systems, the burden of security today falls upon the user. A number of installations, governmental as well as commercial, have been successful in instituting computer security programs, with varying degrees of effectiveness.

The successes have resulted in increased cost-effectiveness of computer services, minimization of mistakes, prevention against various threats and a recovery capability in case of disaster.

**Peter Browne On Security**

Failures have resulted in increased costs and in security programs that are inconsistent in their application. Many approaches toward installing security result in high protection against low-risk threats, whereas significant threats are unattended.

Protection must be based on need, not on the degree of management alarm over a particular vulnerability. Computer security is nothing more than cost-effective risk management. It is a systematic, quantified approach to identification of threats, system vulnerabilities and means to reduce these vulnerabilities.

The approach is not new; in fact insurance companies are traditionally oriented this way. The key factor is the need to be systematic and comprehensive.

### Analyze Environment

The first step is to analyze and define the computer system and its environment. This would include a listing of hardware, physical facilities, input units and remote terminals, along with their replacement costs.

Then, the security planner should attempt to describe the major processing tasks; at least list and flowchart them. Along with this there should be a categorization of the installation's data. This job is easy if there is a resident data base administrator. If not, good luck!

Next, the value of equipment, media and valuable papers should be determined. The analysis should conclude with an audit of current operational control and job flow procedures.

Step two is to perform a threat analysis. There are a number of ways to classify hazards. Perhaps the best is to sit down and do a little brainstorming. Try to find all the possible risks that the installation will face.

For example, a fire could originate in the computer area or elsewhere in the building. Water from burst pipes or fire-fighting, smoke, dirt or dust, the effects of vandalism, careless or accidental acts of employees, sabotage, power failures or fluctuations, accidental breakdowns or just plain errors will do their damage.

The security planner might consider the possibilities or probabilities of any one of these events occurring. For example, statistics on fire can be obtained from the National Fire Protection Association or even a local fire marshall. One approach is to make an exhaustive list of

***Part VI***
***The Rational Approach***

threats, then circulate it among knowledgeable people. Many new ideas can be gained.

The third step is to analyze the present system in terms of potential exposure to hazards. Here is where being systematic helps considerably. There are at least two approaches to this analysis.

For example, one can list major data files on the left hand side of the page and then compute the costs if those were destroyed, modified or disclosed, either accidently or intentionally.

A different method would be to model interfaces between the elements of work flow and search for system vulnerabilities.

A third approach is to look at the system, rather than the flow of work through it.

Next, one would approach the subject of protection requirements, timeliness criteria and costs. Requirements for protection must necessarily follow the vulnerability analysis. Those exposures which are significant (probability of loss is relatively high) should be targeted for protection.

Timeliness requirements refer to the importance of a particular DP task. If the system were to be interrupted prior to the biweekly payroll run, the effect is

*(Continued on Page 11)*

# Security Is Really Cost-Effective Risk Managing

*(Continued from Page 10)*

different than just after. This has great relevance to prevention as well as recovery.

Finally, determine the cost of potential loss and delay. Identify the areas of exposure; compare each significant risk with the processing requirements.

The essential idea is to estimate the cost to reduce the current level of vulnerability of hardware facilities, the operating system, the applications software, the documentation and the major data files.

The fifth step is to analyze and determine possible methods of protection. A mix of physical security procedures and other management controls, software, backup/recovery and audit mechanisms may be employed. Costs of protection must also be determined.

The last task is to then match protection against need and devise a cost-effective mix of preventive measures and recovery. One would normally tend to install preventive measures but this is difficult to do against low probability events on a cost-effective basis.

For example, an airplane probably won't come crashing into the computer center. But in case it does, the DP manager should be prepared to find some method to continue operations so that the organization doesn't fail as a result.

It is also possible to collect statistics on the frequency and duration of power failures and their effects on the computer system. These can be related to the cost to buy and operate an emergency power supply. If the costs are less than the losses that one can accurately predict, the installation should go ahead and buy an emergency power supply.

The above exercise shows that being rational about computer security is more effective than the common approach of installing protection against the threats that gain attention first. Computer security is nothing more than applied common sense.

*Part VII will discuss software aspects of data security.*

*Peter Browne is manager of the security operation, General Electric, Information Services Division, Bethesda, Md.*

## Prize-Winning Reporters Use DP

PHILADELPHIA – "It would have been impossible without the computer to come up with all we did, unless we had taken five or six years to do it all by hand." That was the comment of James B. Steele, a *Philadelphia Inquirer* reporter who, along with Donald L. Bartlett, won the 1973 Heywood Broun Award for a series exposing institutionalized discrimination against minorities in the Philadelphia criminal courts.

Bartlett and Steele used a computer to process about 100,000 pieces of information concerning the handling of approximately 1,000 cases of violent crime in Philadelphia, Steele said. The information taken from the cases was put on thousands of punched cards and then the information was cross-tabulated. Programming was done in Data Tech, a language very often used in projects dealing with the social sciences, Steele said.

The actual computer work took about two months, Steele said. "We spent a great deal of time cleaning the deck because all the information was of such a sensitive nature – we wanted to eliminate just as many conceivable possibilities of error as we could," he said.

Time was rented on an IBM 7090 for most of the project.

## DP Tests Spacecraft

REDONDO BEACH, Calif. – Computerized environmental testing of new spacecraft, including a global network of satellites (FLTSATCOM) to provide instant communication between U.S. Navy ships anywhere in the world, is being performed at TRW Systems.

First use of the Xerox 530 was to support a specialized dynamics test in which the FLTSATCOM spacecraft's natural modes of vibration are determined. The system was used in a real-time environment to acquire, reduce and display massive amounts of this model data.

## Specialized Software in Evidence

# Applications-Oriented Products Dominate Exhibits

By Vic Farmer
and Ronald A. Frank
Of the CW Staff

WASHINGTON, D.C. – Dedicated application systems designed to meet specific user problems were very much in evidence at the opening of the Third Annual Computer Caravan sponsored by *Computerworld* here last week.

Intelligent terminal systems, minicomputers and peripherals for both users and OEMs dominated the show, with an increasing amount of specialized software products demonstrated.

While few totally new products were announced, most exhibitors stressed recent applications-oriented upgrades to users visiting their displays.

Fitting right in with the famous Washington pandas, Pansophic Systems, Inc. announced its Panda disk file usage analysis system for 360/370 OS and OS/VS users.

Panda provides reports with information on: total number of tracks and extents allocated; number of tracks used, unused and available for extension; dead space which could be recovered by reallocation


or compression; percentage of allocated space in use; data set characteristic (BLKSIZE, LRECL, DSORG, etc.); and indication of whether the data set is cataloged.

Information about each volume includes the percentage of tracks available on each volume that are allocated; volume table of contents; total number of dead tracks; defective track information; and the availability of space remaining on each volume. Panda is priced at $1,800 from the firm at 1301 W. 22d St., Oak Brook, Ill. 60521.

Texas Instruments demonstrated its soon-to-be-announced Basic software for the TI 980A minicomputer. Described as a subset of Dartmouth Basic, the language will be available in card, tape or cassette format beginning in April.

The new version of Basic can be used as an educational tool in computer science courses and as a debugging aid in developing Fortran programs, a TI software specialist said.

The software will cost "about $200" but will not include the ability to handle string variables or multidimensional arrays, although these capabilities could be added later.

Prime Computer, Inc. had a working virtual memory system of its 300 minicomputer which was used to run a mathematical model of the world's ecology. The software was originally written at Lehigh University to run on a large scientific system such as the CDC 6400, a spokesman said.

The Prime mini used 40K of real core with 3M words of disk-based virtual storage.

By manipulating such parameters as population growth, "quality of life," etc., the model projected potential impacts on the world's ecological balance to the year 2100.

Delta Data Systems announced a more powerful, but less expensive version, of the standard Delta 5200 CRT terminal. Priced under $3,000, the new 5500 offers a 2K-character memory, communications speeds up to 9,600 bit/sec, and bit parity checks without response, in addition to other characteristics previously available on the 5200.

The system has a paging memory to recover rolled off data, editing functions, 7 by 9 dot matrix characters, blinking and underlining for selected characters and compatibility with most computers and terminals. Up to 27 lines of 80 characters can be displayed.

### 8 Diskettes?

For the user not content with just one or two floppy diskette drives, Shugart Associates displayed the new SA3900 storage facility which includes from one to eight SA900 diskette drives. Designed for attachment to data entry systems the SA3900 is a random-access, floppy disk system which is media-compatible with the IBM diskette or user-specified formats.

An SA3900 with eight drives can access eight interchangeable diskettes providing up to 24.8M bits of on-line data storage. The system is priced under $3,000 with two diskette drives.

Data General announced its interprocessor buffer (IPB) which allows for synchronization and communication between two Nova minicomputers with shared disk storage. The unit consists of two standard circuit board assemblies, one in each computer.

The company also has updated its real-time disk operating system to RDOS-3 to handle the IPB use.

### Either Can Control

The dual processor arrangement, in addition to supporting shared files and protected files, can allow either computer to take over control in case of failure. This includes the takeover of both computer memory and controllers, according to a spokesman.

IPB costs $4,100 and the updated version of RDOS-3 is free to users of the system.

Calcomp brought to the show its new Microfiche Management Software (MMS-II) for its Model 925 microfiche recorder. When formatted at 32 line/page, blocked at 20 lines and at an input tape density of 1,600 bit/in., MMS-II allows throughput at 42X of 1 microfiche frame each 34 seconds. Also announced was a plumbing-less processor for the system.

Control Data announced its 9315 matrix printer for the OEM market. The 132-column printer runs at 173 char./sec and is priced at under $2,000.

# Editorials

## Privacy — Is This the Year?

The news that police departments are quietly opposing new regulations on criminal offender banks is disquieting, even if not totally unexpected.

The news is particularly disturbing since the two major proposals for reform in this area do little more than codify into law regulations that the FBI and the police claim to have been following for years.

If such regulations have in fact been followed by these agencies, why should they be upset with the prospect that they will become the law of the land with full civil and criminal penalties for violators?

Of course, there can be many legitimate objections to certain aspects of both bills, but that should not be the cause for blanket condemnation of the measures.

Constructive, well-thought-out proposals aimed at those weaknesses should be submitted for debate and possible adoption by the Congress and the American people.

In the past the police and federal agencies involved with maintaining criminal justice information have had things pretty much their own way — in effect, saying they should be allowed to regulate themselves.

But that is not good enough for the American people any longer. They are now demanding some well-reasoned legislation spelling out the individual's rights to privacy in such systems and clearly stating penalties for violations of those rights.

The police should welcome the opportunity to join in this effort — after all, they have the experience needed to specify workable and realistic legislation.

But if they insist on footdragging and complaining without suggesting real alternatives, they will deserve whatever legislation is imposed by those without experience.

However, if all parties to the debate work together, from the most radical civil liberties advocates to the police, 1974 could be the year that the U.S. finally passes its first truly workable and effective privacy act.

## No More Programmers?

The Taylor Report this week (Page 14) again envisages a future purged of those troublesome software artists, those excrescences on the DP budget, the programmers.

He reminds us that once the rails were laid from coast to coast, few railroad construction workers were needed. But would that have happened if each railroad had adopted a different gauge? For each division?

A better analogy, it seems to us, is the scribe. In olden times, people were illiterate; a small group wrote the letters and kept the records. Now we have, except in remote corners of the earth like Nepal and Southern California, universal literacy. Have scribes disappeared? We love them dearly; they now operate golf-ball typewriters, and there are myriads of them!


*'Let's Tiptoe Through It Just One More Time...'*

## A New Kind of User Group—Part IV

What kind of 1978 machine family would a really sophisticated vendor-independent user group specify? First, I must explicitly disclaim any *right* to predict: remember, this is to be the decision of the members of the Group, of which I cannot hope to be more than an associate or at best, perhaps, a mascot.

In the most general sense, however, only four options exist. The obvious and most likely one we can call the 380: a hardware/software system or family compatible with and extending the power of the IBM 360/370. This will, of course, be much less attractive if *IBM* brings out a 380 in 1976, and for that reason design and especially manufacturing contracts could hardly be let before June 1976 if the 380 option is chosen by the Group.

A second and much less likely option we might call the 1111: a hardware/software family compatible with one of the other fourth-generation systems. Not necessarily Univac; could be the ICL 1900 or New Range, could be some other system with heavy software already working, much applications software available, many customers in place and anxious to stay non-IBM. The post-1110 label is just a euphemism.

The third option, less likely than the 380 but at least as likely as the 1111, is the specification of an all-new, non-360/370-compatible family. If the Group felt, for instance, that something completely different was needed, and that it could hang on into 1978 or 1979 with its fourth generation hardware and software, it might lay out a radical system beyond what IBM offers in 1976, and back its development. The cycle would be much longer than the 380 cycle, and therefore the Group would have to authorize detailed design before 1976 and the IBM blast-off. There would be a real risk that IBM might preempt the radical option by announcing, from what undoubtedly will be two or three parallel internal parallel efforts, its maximum novelty: an array processor, for instance, or hologram memory.

I hope fervently that the members would completely reject a fourth option, which would be to wait for the IBM 1976 system, and then sponsor a compatible competitor if the new machines are *not* 360/370 compatible.

I have a pet candidate for the radical option: an associative-memory system somewhere out beyond Staran. It would completely obsolete everybody's system software and business applications, and most of the scientific applications. But for the good of the Group — that is, to maximize cost benefits for its parent organizations over the 1976-1988 generations — I suspect the 380 option would be adopted. If it worked, a later project to pursue the radical option might be possible, phased three or four years behind.

*The last column in this series will discuss finances, recruiting of members and other startup problems.*

Herb Grosch

## Letters to the Editor

### Work Incentive?

Re Pat Ward's story on Page 6 of the Feb. 13 issue:

It occurs to me that if a programmer is laid off and has difficulty finding a new job, he should consider the possibility of committing a crime in Arizona so that he can be incarcerated in the state prison where he can be employed as a programmer. The salary (less than $1 an hour) is all gravy considering that room and board are free. Hopefully, it is not subject to federal tax.

Somehow, this story is linked in my mind to *Computerworld*'s Page 1 story of recycling CPU heat in Hartford. Is Arizona recycling CPU people?

Morton Burdman
White Plains, N.Y.

### Naming Priorities

In reading the article, "Bad Package Cited in Delay of School Grades" [CW, Feb. 13], wherein it is reported that IBM's Epic program is not working, my reaction to reading the names of the four parts of the program — Fast, Socrates, Student and Budget-Finance — is that perhaps IBM spends more time thinking up names for its programs than designing the program.

Robert Kahn
Lafayette, Calif.

*Computerworld* welcomes comments from its readers. Preference will be given to letters of 150 words or less. Letters should be addressed to: Editor, Computerworld, 797 Washington St., Newton, Mass. 02160.

# Letters to the Editor

## Professional Virtues Sadly Needed Today

Professionalism, NUTS! How can we strive toward an ideal when nobody can even define it?

What we need in this industry (or profession, or business) is people with a sense of personal responsibility, a conscience. Come to think of it, some other industries (or professions, or businesses) could use a strong dose themselves.

Until the majority of data processors can lay claim to this unique-and-rare-quality, the same old problems will continue to exist and be compounded. I hardly see how we can claim to be a profession until we are able to display some of the virtues of a profession.

John C. Schmidt
Tulsa, Oklahoma

## These Are the Facts Of an S/3 Installation

Vic Farmer's Feb. 6 article hit at the "real life" of data processing without such confusing and meaningless factors as virtual vs. real, Cobol vs. RPG, information management, etc.

The cost of $27 for 1,000 cards read and lines printed was of particular interest. This means a payroll system using 12 I/Os per employee would cost an S/3 installation about 32 cents a check.

Further, our records show most accounting systems, which are reported to consume 90% of computer usage, produce 10 to 15 lines of print per card punched. This results in a total cost of 27 to 40 cents for each card processed or five to eight times the usual pricing of five cents per card keypunched.

Perhaps someday we will not need edit reports, payroll journals, receivable ledgers, to pay lists, and all of those things that make our computers prolific paper consumers. However, this is not the case today, and Farmer's article has finally presented some statistics businessmen can use to determine what an in-house installation may actually cost.

Ben Blumberg Jr.
President
Programs & Analysis, Inc.
Burlington, Mass.

## Finding the S/3 User

The Feb. 6 article, "Most S/3 Sites Cost $69/Hour," occupied 19 square inches of space, contained 36 lines of print and six paragraphs.

I suppose if we developed these statistics on all the articles we could determine if the space is being used effectively. This would be as valid as the statistics used to determine if System/3 users know how to use their machines effectively.

Meter hours logged has little, if any, bearing on effectiveness. I have seen ineffective centers logging in excess of 300 hours, and effective centers logging less than 125 hours.

The article implies that the more lines of printing turned out, the more effective the center. Turning out mountains of unused reports has long been a major sin of DP centers. Many centers could become more effective by reducing the number of lines printed.

Cecil C. Daffron
Troy, Mo.

## Individual Ability Should Be Criterion

Concerning the article in the Jan. 23 issue concerning lower salaries being paid overweight DP executives, I wonder how the EDP community would react to news that black DP personnel are paid less than whites in similar positions. Or what would an employment agency say to a request for a Gentile DP manager?

Firms should be encouraged (if not prodded by legislation) to consider only an individual's ability to do a job, and not someone's idea of what constitutes an attractive addition to the office floor.

Chris Malaxos
Toronto, Ont.

## On Writing Contracts

The article by Marcia Geyer on Page 1 in the Feb. 6 issue is very interesting and covers many of the points that should be considered. I fear, however, that her last point – that legal reviews should become a formality – may be taken too literally by some of her readers.

I read that many lawyers are old fogeys and often seem to work with glacier-like speed, but a knowledgeable English judge once wrote to "lawyers who live upon litigants' fees" that:

*"When a festive occasion your spirit unbends,*
*You should never forget the Professions' best friends;*
*So we'll send round the wine and bright bumper fill,*
*To the jolly testator who makes his own will."*

The same could well apply to computer people who write their own contracts.

Robert P. Bigelow
Boston, Mass.

## Interest vs Dividends

Re "Why Not Go to the Market . . . and Make a Deposit?" [CW, Feb. 13]:

The first thing that caught my eye was the reference to "how many can conduct all their banking business at the local grocery store?" – "First Federal Savings & Loan Association customers can now do exactly that."

Savings and loan associations are not banks and, therefore, cannot provide banking services to the public.

When you deposit money in a savings account in a bank, you receive interest, which is money paid for the use of money.

When you put money with a savings and loan association, you receive dividends as a stockholder or shareholder.

Robert G. Ziemer
Vice-President
Northwestern National Bank
Minneapolis, Minn.

## Revitalization First!

Re "A New Kind of User Group – II" [CW, Feb. 13]:

"Another user group, another association." We hear this suggestion quite frequently. Do we really need another group or association? I think not. What we really need is to work through the groups and associations we now have to accomplish our objectives.

In the past few years, our national and international data processing associations have been improving in their abilities to understand their memberships. There is more cooperation between organizations. They have begun to take on the issues. All of this has come about because the respective memberships of these organizations have begun to take an interest. This is what we need more than a new group – a revitalization of the members of our current associations. What you have proposed so far would require strong support from a large membership.

If we continue to divide the DP professionals among more and more groups, each separate group will be weaker. I would must rather see *Computerworld* support our current organizations. Through its editorials it could install a new awakening to the membership of these organizations, and through this, begin to accomplish what it is interested in, a new awareness by the hardware manufacturers of our needs, a new awareness of management in developing real DP professionals.

CW has some good ideas; please do not waste them. Help us to build from what we have so that our organizations can be heard when they speak up for us. Let's not weaken what we have.

Cornelius M. Head
Indianapolis, Ind.

**I want Share and Guide to disband, and have said so loudly for nine years. Putting my own views aside, how can CW support outfits that exclude us from their meetings and refuse to send us their publications or committee rosters? HG**

## 'Once I Built a Railroad...'

# Odds Stacked Against Employment of Programmers

**The Taylor Report**
**By**
**Alan Taylor, CDP**

A couple of years ago, with the cutback in aerospace jobs, some segments of the programming community saw bright careers suddenly vanish before their eyes. However, pundits in government offices continued to forecast an ever-increasing growth in the programming profession. Sure enough, after some people had dropped out and gone into real estate, sales or accounting, the situation seemed to straighten out and programmer demand appeared to continue.

The projections of a constant programming career path were apparently valid.

Yet, I wonder. Eighteen months ago I listened to an IBM vice-president talking in Alabama about the next generation of IBM computers. "We must increase the hardware percentage of the data processing dollar" was his theme. The money that is currently going to programming is an obvious target in this case. Since then, there have been similar signs.

A recent *Grey Sheet* on future computer systems detailed how programmers, as the essential intermediaries between the computer and the user, would be eliminated in the future. The signs of a hoped-for reduction in programming costs are clearly in the wind.

The real question is whether this is all hot air, or whether it is both possible and to the advantage of various groups to push on with the job of eliminating programmers.

### Oversupply Is Possible

Technically, there certainly appears to be an oversupply of programmers. Packaged programs, which are now becoming both flexible and efficient, can do much of the work that a programmer can do, with a minimum of effort.

High-level languages now have reduced the need for programmers specialized in the various different systems.

The lack of change in languages in the last 10 years has resulted in the development of productive specialists in the languages, people who have really had five years' experience and not just repeated one year's experience five times, because of equipment changes, etc.

At the same time, computer use has also been growing. Vast networks of interconnected systems with intricate system software connecting the various points are now in use. But in these systems, while the absolute magnitude of the programming effort is larger than for an old-fashioned single installation, the ratio of programming cost to the amount of computational operations has dropped drastically, as the same programs are used by hundreds of different sites. So the increased use of computers is no guarantee of a continued demand for programmers.

This is probably the key fallacy in the various projections for programmer demand. They have in one way or another assumed that the volume of automated computation governed the need for programmers. It did, once during the installation phase of the operation. While we were discovering how to run computers, programmers were needed everywhere, in the same way that during the initial stages of railroads construction men were needed to lay the lines.

Later, however, only the construction expertise was still needed by the railroads – but more for maintenance rather than for expansion.

The need for professional programmers has yet to be seen, as far as I am concerned.

### Manufacturing Problem

Moreover, the large computer corporations do need to do something about their own turnover problem. Manufacturers can easily foresee a situation where a greater use of their product is accompanied by a major reduction in their income! Therefore, they have no reason to let money, which could go into their own pockets, go to programmers. It can be expected, therefore, that they will be prepared to spend millions of dollars to extend their market to provide for programming in one way or another, instead of letting the individual user provide his own.

What has the programmer to offer against all these odds? Is there anything that can keep the majority of present-day programmers, plus the annual entrants into the profession, gainfully employed? Is there anything which will effectively require installations to keep the programmers on even if they are not gainfully employed, simply as a kind of insurance policy?

Is there something with regard to the future development of the profession – some new expertise or responsibility that they can shoulder – which will allow them to change with the times, the way companies are thinking of doing? If there is – well and good. But let us hear now just what it is, so that we can train programmers for the new role that is coming fast upon them in this time of potential massive oversupply.

### Future of Computers

**"The marketing problem (for future computers) becomes quite apparent when one recalls that after 25 years there are still less than 200,000 conventional computers in the world. For economic production, it is desirable to sell that many processors *per year* . . .**

**. . . it may be possible to communicate with the computer in English and have it directly produce programs without the need for 'programming' as it currently exists. The Advanced Research Projects Agency (ARPA) of the Department of Defense is funding research in such areas, under the heading of 'automatic programming' at several universities, including MIT's Project MAC Automatic Programming Division."**

**(Extracts from *The Future of Computers*, Stuart E. Madnick, July/August, 1973, Technology Review, MIT.)**

# Epoch 4:
# A solid-gold investment.

The good thing about putting information on Epoch 4 is that you get back exactly what you put in. No more, no less.

Because Epoch 4 is 100% certified, you can be sure that your data will read and write correctly every time. That means automatic savings on downtime and overtime.

And, because Epoch 4 is protected by a 20-year warranty, you can spread your investment over that period, too. This means you end up paying something like 6¢ a month per reel for the finest broad spectrum computer tape you can buy.

Epoch 4. It's as good as investing in gold. Maybe even better.


GRAHAM MAGNETICS
Graham, Texas 76046

# Outside Supports Aid Data Base Management Users

## ● Nets Supplement In-House Systems

By Don Leavitt
Of the CW Staff

Users are finding that a growing number of time-sharing or remote-computing networks now provide data base management systems that follow the Codasyl specifications. And there are some services on the networks that go beyond the Codasyl "specs," to the user's advantage.

The basic problem of terminology gets in the way of the user trying to find out what is available on the nets, however, just as it can confuse the user evaluating software for in-house equipment. A rash of inquire/retrieve services is available and too often the nets tag these with some sort of phrase like "data management."

**True Support**

The wide-ranging nets that do have true DBMS support obviously relieve the user of the entire problem of maintaining the communications gear that is often the key to effective DBMS operations. They also take on the responsibility of maintaining the DBMS control system itself.

But the nets do not take on the user's basic responsibility of maintaining the data itself. The need for a data base administrator is just as important in the remote-computing environment as it is in the in-house setting.

The need in either environment depends on the number of users and the complexity of the data, but the user-count parameter may be surprisingly low. If a client has six or more users, a network spokesman said recently, "it is almost fatal not to have a single manager who has that responsibility."

Some of the systems on the nets are the same as what the user can install in-house. MRI's System 2000, for example, is installed on CDC's Cybernet and is being tested on CSC's Infonet.

DBMS-10 was developed for DEC by Rapidata and is available on that network's Decsystem-10 as well as being available as a product from DEC. A subset of the Codasyl specifications, as most current systems are, the network's system goes one step beyond DEC's. It supports Fortran as well as Cobol as a host language for the applications programmer.

Another Decsystem-10-based service, System 1022 has been installed on both First Data and Cyphernetics networks, though the vendors' approaches appear to be somewhat different. First Data seems to be concerned with letting the DP-oriented know how the system works; and Cyphernetics, with letting the non-technical user know what he has to do to get the results he wants.

**More Testing**

In addition to testing System 2000, Infonet is also testing its version of TRW's Generalized Information Management (GIM) system, and is providing Data Management Language (DML), another in-house development that is both a language and a DBMS.

All three systems have different strengths and if they are all finally installed on a regular basis, an Infonet source noted, the user will be able to pick the one best suited to his particular needs.

Even users with IMS/360-370 installed in-house can look to remote computing for support. Interactive Data Corp. recently announced availability of Dlitest, a test bed facility for application programs that will run under the DL/I portion of IMS.

Another development is the DBMS support that Scientific Time-Sharing Corp. provides APL-oriented users, with Shared Information Management System (Sims) on APL-Plus network. A long way from the original workspace in which each user kept his own data and programs, Sims calls for a "steward" within the user organization, with functions very much like a data base administrator.

## ● Packages Pick Up Inquiry Facility

Data base management systems have tremendous power, users agree, but are often hard to access for simple queries and programs that a non-DP type could write without professional help. Therefore, several independent software houses have developed interfaces between their products and DBMS.

The list of such interfaced products grows continually but already includes such report-writer Cobol precompilers as Culprit from Cullinane; Score from Programming Methods; Data Analyzer from Program Products Inc.; and Asi-st from Application Software. Each of these has been linked (optionally) with either IBM's IMS or Cincom System's Total.

Culprit has also been interfaced, with the Integrated Data Base Management system (IDMS), a Codasyl-compatible DBMS also available from Cullinane Corp., and University Computing's RDMS.

Asi-st is being used very heavily in some installations with either – and sometimes both – IMS and Total, and with DBMS users have developed for themselves. Since the actual data handling is transparent to the user, programs written in this or any of these user-oriented languages can be shifted from one DBMS to another without any essential change, an ASI source noted.

Query Language/One (QL/1) now available from Programming Methods was written initially to work with the Data Language/One (DL/I) portion of IMS. In that respect it differs from some of the packages that were self-standing report writers before they gained ties to the larger control systems.

While report writers and similar utility-type software have been the most prominent in the list of packages brought to the DBMS environment, there are others. The MMS general ledger system from Software International, for example, has been interfaced with both Total and IMS.

## Cobol FDs Generate Dictionary Entries

BURLINGTON, Mass. – An IBM 370/370 user faced with building a data dictionary for a generalized data base management system (DBMS) can do the job more easily than before with version 3 of the Data Catalogue from Synergetics Corp.

A data dictionary lists data available under a DBMS and is vital to effective use of the data base. Creating and maintaining the dictionary file is critical to its value.

Under the Data Catalogue software, the dictionary file can now be built from existing Cobol File Descriptions (FDs), "significantly" reducing clerical effort normally required.

Through recognition of pseudonyms, the system documents all uses of comparable data by source and end-user department, by input document, application program and output report. Thus, proposed changes can be discussed with all concerned to determine possible impact before the changes are made.

The package includes a keyword-in-context facility to eliminate data redundancies that might not be obvious with a single-word comparison of data field names.

IMS users of the system can create Data Base Definition (DBD) modules and Program Specification Blocks (PSBs) directly from the catalogue or dictionary file.

The Data Catalogue operates under both DOS and OS/360-370 and is available in object code for $9,000.

Synergetics is at One Garfield Circle, 01803.

## Financial Control Monitored By 'Audit Analyzer'...

NANUET, N.Y. – Internal auditors with access to 360/370 equipment have another alternative to dependence on the DP staff to develop programs for financial analysis. They can do it themselves with the Audit Analyzer package from Program Products, Inc. (PPI).

The Analyzer is applicable to any system or segment of a user's business, including payroll, accounts receivable, savings accounts, loans, inventory or purchasing, PPI said.

The package provides the auditor with a non-procedural request form on which he can state his needs in terms familiar to him rather than in DP-oriented expressions. Default options permit basic reports to be produced with three or four short statements, PPI said.

Beyond that, the Analyzer includes a library of auditing functions already coded and maintained by PPI, which are accessible by name. Functions provided include stratifying and aging data, sequence checking, exception reporting, comparing data between fields and preparing confirmation notices.

The user can develop and store for later use his own routines, so that they need not be coded anew each time he wishes a regular analysis and report. Multiple reports drawing data from one or more files can be handled in a single pass.

Although based on the concepts used in PPI's Data Analyzer, the Audit Analyzer is a stand-alone package. Written in Assembler language, it sells for $12,000 and runs under either OS or DOS.

For current Data Analyzer users the incremental cost of the Audit Analyzer module is $5,000, the company said from 20 Old Turnpike Road, 10954.

## ...or by 'Audit Reporter'

EAST ORANGE, N.J. – Computer Audit Systems, Inc. has upgraded its Cars 2 Audit Reporter package with expanded file-processing capabilities, surveying capacity, a new report default structure and with handling of Ascii files.

Cars 2 Audit Reporter, written in ANS Cobol, is designed to let internal financial auditors check company records without requiring help from the DP staff. Basically a report writer, it includes a set of precoded routines the auditor merely invokes to perform various tests.

While the Audit Reporter has already included logic for working with matched master and transaction records and with unmatched transactions, version 2 now enables the user to specify handling of unmatched primary records as well.

Comparisons can be made on greater than or less than bases, and are no longer limited to direct matches, the company added.

The Audit Reporter provides users with as many as 11 reports per pass, with three heading and two detail line formats per report.

Present Cars 2 Audit Reporter users will be upgraded to the new version without extra cost. Otherwise, the package is available for $11,500.

# S2000 Gains Report Tool

AUSTIN, Texas – A Univac 1100 user with System 2000 data base management software can define and generate as many as 100 formatted reports from a single scan of the data base indices, with a new report writer feature from MRI Systems Corp.

In common with report writers previously available for S2000, the new feature allows the user to save time by setting up reports without coding in a procedural language. The technique of scanning only the data base indexes, rather than the whole base, reduces search time once the requests have been prepared, MRI said.

S2000 itself is operational on IBM 360/370 and the CDC 6000 Series as well as Univac 1100s but the enhanced report writers for the IBM and CDC systems are still under development.

**Built Up Totals**

Within each report, the Univac user may specify headings and footings for each page, for each logical section and for the report as a whole.

In addition to working with elementary data base items, the user may specify as desired output items which are built from sums, counts or arithmetic combinations of other items.

The report writer may be used on an interactive or a batch basis, MRI added.

S2000 versions operate under IBM's "real" OS and both OS/VS1 and VS2; under CDC's Kronos and Scope operating systems; and under Univac's Exec VIII and CSTS. The data base management system itself costs $25,000.

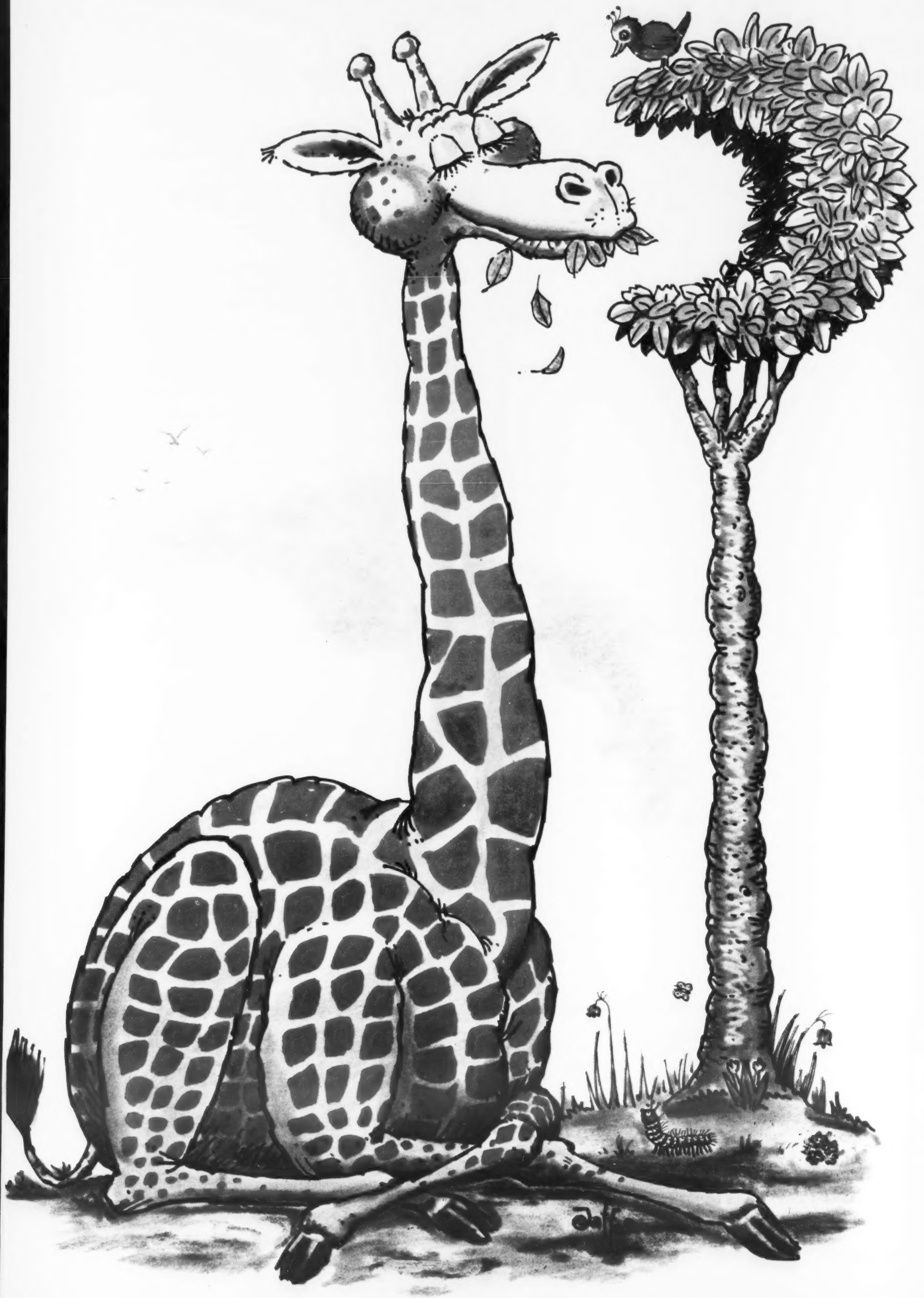
The Univac-oriented report writer feature costs an additional $15,000.

MRI can be reached through P.O. Box 9968, 78766.

# *Spanish Is Output Of Payroll Module*

TEWKSBURY, Mass. – A Mexican Module available with Payroll II from Wang Laboratories (formerly PHI Computer Services) produces all registers, reports and checks in Spanish. In addition, the module calculates all Mexican federal taxes and government controlled bonuses and profit sharing.

Payroll II operates on IBM 360/370 under OS, DOS and VS environments. The Mexican package is available from 836 North St., 01876.



# Relax...

Why stick your neck out, even when you need to process more and more data?

Come to Inforex. Because our new System 1303 makes the chewing easy. Regardless of your data diet.

Inforex is number one in key-to-disc data entry. And we can stack up more capabilities than anyone else in the field. So why stick your neck out? Go with the leader and keep your computer satisfied.

Now, Inforex System 1303 offers improved key-to-disc data entry. With capabilities like: advanced applications oriented editing and cross footing. Eight levels of program control with up to 1000 bytes of blocking. Bi-synchronous communications from 300 to 9600 baud for local and remote installations. Line and serial printers. And a 2400-foot, 45 inches per second, tape drive, in standard densities, for direct computer processing.

System 1303 thrives on any diet. A proven price performer for: payroll, receivables and payables, order entry, inventory control, and more.

Choose Inforex. We're your answer. Concurrent data entry and verification plus CRT display on System 1303 make sure your computer is getting the right input. There are other enhancements like eight levels of reformatting, virtual program control, automatic batch transfer and complete operator statistics, including keystrokes. So you can be assured that each job has been efficiently prepared for final computer processing. In addition, file search and update in place on both disc and tape continue to be an Inforex exclusive.

Maybe that's why so many companies all over the world have chosen Inforex. For a demonstration, call us. We're the high performance feed company for your computers. Offices in major cities throughout the United States, Canada, and Europe. Distributors worldwide. Inforex, Inc., 21 North Avenue, Burlington, Massachusetts 01803.

INFOREX

# CLINIC COUNTERPOINTS: Many Ways to Initialize

## ● For Large Tables

Re Gates' "Good Use of Working Storage Can Speed Subscripting" [CW, Jan. 9]:

Gates stated that "the most efficient method" of initializing an array of totals is to set up an item in Working Storage identical to the total array, but initialized to zeros. This results in one MVC instruction to move the zero-array to the total-array (six bytes), plus the 144 bytes of the zero-array, a total of 150 bytes.

A savings of 138 bytes of storage can be achieved with the following approach by adding one additional MVC and redefining the total-array.

```
WORKING-STORAGE SECTION
01 L1-3YR-ZERO, COMP-3.
05 L1-3YR-BASE PIC S9(7)
05 L1-3YR-REST.
10 L1-3YR-OTHER
   OCCURS 35 TIMES, PIC S9(7).
01 L1-3YR-TOTALS
   REDEFINES L1-3YR-ZERO, COMP-3.
05 L1-YR-TOT OCCURS 36 TIMES, PIC S9(7).
PROCEDURE DIVISION
MOVE ZERO TO L1-3YR-BASE.
MOVE L1-3YR-ZERO TO L1-3YR REST.
```

The initialized L1-3YR-BASE is propagated through the entire array.

This method will execute only one more instruction per initialization that Gates' method, and is more practical for tables larger than the example given, when the Working Storage required may not be available – Michael S. Geary, systems programmer.

## ● In 2 Instructions

I have long used another method of initializing any array of subscripted data, whether it was packed or not. This method is extremely efficient (two instructions) and requires that no extra working storage be set up.

Rewriting the example in the article, the following entry appeared in Working Storage:

```
01 L1-3YR-TOTALS COMP-3.
05 4-YR-TOT OCCURS 36 TIMES PIC S9(07).
```

Add the following redefinitions to the data above:

```
01 FILLER REDEFINES L1-3YR-TOTALS.
   05 L1-FIRST.
10 L1-FIRST-FIELD PIC S9(7) COMP-3.
10 FILLER PIC X(136).
05 FILLER PIC X(4).
01 FILLER REDEFINES L1-3YR-TOTALS.
05 FILLER PIC X(4).
05 L1-SECOND PIC X(140).
```

In the procedure division, the code is simply:

```
MOVE ZERO TO L1-FIRST-FIELD.
MOVE L1-FIRST TO L1-SECOND.
```

The first element of the array is initialized with the first statement. The second instruction is simply an MVC which moves bytes 1-140 of L1-3YR-TOTALS to bytes 5-144 of the same field. Since an MVC moves the data one byte at a time, and from the high-order to low-order portion of the field, the effect is to "ripple" the first element (now zero) through the rest of the array.

The advantages of this technique are that it saves core, is very efficient, and the array can be initialized to anything simply by altering the first MOVE. – Karol Hines, director of technical operations.

## ● CDC Is Different

It seems that the construct:

```
MOVE ALL C-3-ZEROES TO
   L1-3YR-TOTALS.
```

Where C-3-ZEROES is defined as follows:

```
01 C-3-ZEROES COMP-3.
05 FILLER PIC S9(7) VALUE ZERO.
```

would generate two instructions (an MVC of C-3-ZEROES into the first word of the target area and an overlapped MVC of the target area to itself) at the cost of only one word of core instead of 144 bytes of core. This reduces the core cost by 140 bytes at the cost of only one instruction.

I do not claim to be an expert on the IBM 360/370 Cobol compiler but I would assume that my proposed translation of the Cobol statement is the most probable. Any other approach would be needlessly wasteful of execution time and not necessary for generality. My experience with Cobol on the CDC 3300, further, bears out this method of translating the figurative constant "ALL."

As an interesting sidelight, on the 3300 I would code this as:

```
MOVE ZEROES TO L1-3YR-TOTALS.
```

since COMP-3 is not used and the compiler sets aside about a 16-character area of zero-filled core for implementing moves of this type. – Lawrence A. Ruh, MS, CDP.

## ● Use VALUE Clause

Try to initialize all fields that need initialization by using the VALUE clause in the DATA DIVISION instead of moving literals into the fields later in the PROCEDURE DIVISION. The VALUE clause takes no instructions (no core, no CPU time).

A better way to zero an array than looping is to declare an initialized FILLER ahead of the array and propagate that FILLER to the real array. For example:

```
01 ACCUMS COMP-3.
05 FILLER PIC S9(9)V99 VALUE ZERO.
05 AC-LIST OCCURS 9 PIC S9(9)V99.
MOVE ACCUMS TO AC-LIST.
```

In the PROCEDURE DIVISION, moving a predefined field with the desired value is more efficient than moving a figurative constant (ZEROES, SPACES, ETC.). For example:

```
MOVE '    ' TO FLD is better than
   MOVE SPACES TO FLD.
```

A particular offender is clearing out a print line. Use the following code:

```
77 MYSPACES PIC X(133) VALUE SPACES.
   MOVE MYSPACES TO PRINT-LINE.
```

rather than

```
   MOVE SPACES TO PRINT-LINE.
```

Try to make the literal being moved the same length as the receiving field. For example:

```
77 GETLIT PIC X(8).
   MOVE '123' TO GETLIT is bad, but
   MOVE '123    ' TO GETLIT is good. —
```

M. Greenbaum, supervisor, computing & communications.

## ● Mimic Assembler

This comment considers the proposed way to initialize a table in Cobol. The following method works fine on byte-oriented machines. I am sorry to say that I do not know how it will work on a word-oriented machine.

The following table-entry appears somewhere in DATA DIVISION:

```
01 TABLEX.
03 TAB COMP-3.
05 ELEMENTS OCCURS 112 TIMES.
07 T-E1 PIC S9(7).
07 T-E2 PIC S9(3).
03 TAB-R1 REDEFINES TAB.
05 T-EX1 PIC X(666).
05 FILLER PIC X(6).
03 TAB-R2 REDEFINES TAB.
05 T-RE1 PIC S9(7) COMP-3.
05 T-RE2 PIC S9(3) COMP-3.
05 T-EX2 PIC X(666).
```

Now the table is defined as it shall be to perform the initialization, which has the following entry somewhere in PROCEDURE DIVISION.

```
MOVE ZERO TO T-RE1, T-RE2.
MOVE T-EX1 TO T-EX2.
```

The above coding results in two ZAPs and one MVC (or a macrocall, because of the length involved). The method is used by any reasonable assembler-programmer, but I cannot see why Cobol-programmers should not have the pleasure to use its incredible speed and at the same time put the core-use down to a minimum – Ole Sjolund, programmer.

# COMMUNICATIONS

## With Dataspeed 40 CRTs
# Termicare Keeps Terminals Healthy

By Ronald A. Frank
Of the CW Staff

MAHWAH, N.J. – More than 13,000 teleprinters installed at user installations around the country are being maintained with the assistance of 29 Dataspeed 40 CRTs at Western Union Data Services.

The CRTs from Teletype Corp. operate as part of the Data Services Termicare program which provides on-line dial-up diagnostic assistance to six different teleprinters operating at speeds of 10- to 120 char./sec in various configurations.

### 225 Calls a Day

The Termicare center currently handles about 225 customer trouble calls per day. When a user has a problem with a terminal installed by Data Services, he contacts the Termicare center where he can talk directly to experts who are familiar not only with his type of teleprinter, but who also have on-line access to a data file containing a maintenance history of his particular unit.

The Dataspeed 40 CRTs are connected on-line to the Service Bureau Corp. time-sharing network now operated by Control Data. When a file on a specific terminal is needed, a troubleshooting analyst at Data Services transmits an inquiry to the Termicare data base stored on a disk system at the SBC data center in Cleveland.

The Dataspeed 40 transmits at 300 bit/sec to an IBM System/7 concentrator in East Orange, N.J. The S/7 multiplexes the inquiry with other data being sent to Cleveland and the information is transmitted at 9,600 bit/sec to an SBC 370/158 that processes the Termicare statistics. The required terminal report is sent back to the Mahwah center where the data is displayed on the Dataspeed 40.

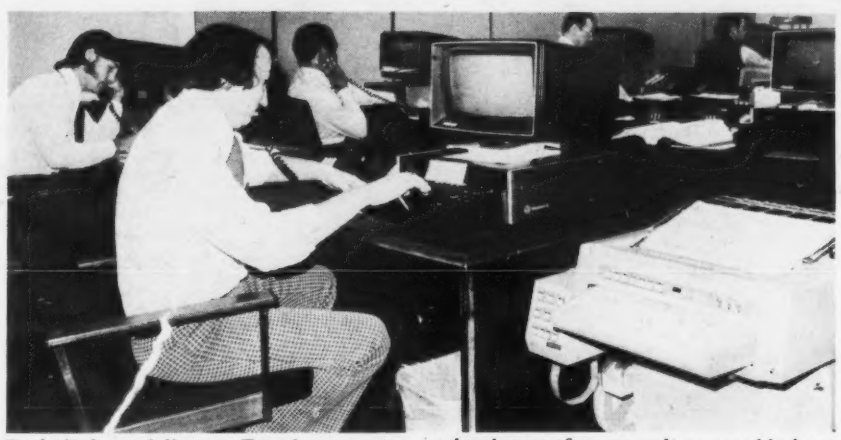
### Benefit

One of the major benefits of the on-line maintenance program is that 20% of all trouble calls can be resolved on the spot by phone without an on-site visit from a repairman, according to the firm.

The software for the Termicare data base was written in-house by Data Services, according to Bill Miehe, manager of special projects. He estimated that the data base contains 200 characters of data on average for each terminal. This is the equivalent of about six months' maintenance history.

Any trouble data older than six months is combined into the total statistics that are continually being accumulated by the Termicare program. As this store of information grows, Data Services officials see additional benefits from the program. Already certain trends have been isolated through Termicare.

In one case when many key tops on one of the terminals supported by Data Services were breaking down, Data Services went to the terminal supplier and corrective measures were taken before a major problem developed.



**Technical specialists at Termicare center use Dataspeed 40 CRTs and Terminet teleprinters (foreground) to troubleshoot units on-line.** CW Photo by Ronald A. Frank

In addition to using the Dataspeed 40 in the Termicare system, Data Services is also evaluating the CRTs for possible addition to its line of equipment. At present the company supplies users with TTY models 28, 32, 33 and 35; the General Electric Model 300 and 1200 Terminet; and associated equipment such as modems, acoustic couplers and magnetic tape buffers.

Most of the teleprinters supported by Termicare operate on dial-up facilities but a few are connected to private lines. For this group, the terminal must be connected to dial-up facilities through a DAA when on-line diagnostics are run from the Termicare center.

In addition to the Dataspeed 40s, the center utilizes Terminet 300 and 1200 printers for output reports along with Model 32 TTYs. Test equipment is also available for on-line diagnostics.

The Data Services field maintenance staff is dispatched from the center and all technical support and engineering data are available. By centralizing the maintenance operation, Data Services has implemented a management control system.

One byproduct of this centralized approach has been the elimination of the user's dependence on one specific service representative to solve equipment problems. As users begin to realize that the efficiency of their terminal maintenance is not tied to one person, they learn to rely on the Termicare center where often they can solve their problems through a phone call.

# HP Has 2780 Emulator Package To Connect 2100 With 360s/370s

CUPERTINO, Calif. – Hewlett-Packard has a remote job software package for its HP 2100 Series that emulates an IBM 2780 terminal, thus allowing the HP 2100 computer to communicate with an IBM 360 or 370 host computer.

The HP 24380A data communications processor can be run under either HP's basic control system in a machine with at least 12K or in a DOS-III system with at least 24K, the firm stated.

With the software package, the 2100 can emulate models 1 and 3 of the 2780 terminal and communicate with IBM's Hasp.

The package enables the 2100 to use the power of the IBM system for assemblies, compilations, report generation, running of Cobol programs and transmission of data, according to H-P.

With the addition of a $700 synchronous interface and 4,800 bit/sec modem, the 2100 using the package can collect statistics on a user's output stream; do line control, parity and error-detection tests; transmit job input and receive job output; and do end-of-file, end-of-transmission, send-to-receive and receive-to-send sequences.

The package offers 10 functions that are commanded by an operator via the system console device, HP stated. Seven of these are off-line functions: magnetic-tape positioning, card-to-tape, tape-to-printer, reassigning I/O devices, sign-on/sign-off, halt and print function list. On-line functions are transmit job input, receive job output and status request.

Job output may be printed directly on a line printer and may be spooled simultaneously on magnetic tape for subsequent printing.

The software package, in paper tape form, costs $1,000 with delivery in two weeks from the firm at 1501 Page Mill Road, 94304.

# Data Briefs

## Court Denies AT&T Stay, Orders MCI Connections

PHILADELPHIA – An AT&T request to stay the injunctive relief recently granted to MCI [CW, Jan. 9] has been denied by the U.S. Court of Appeals for the Third Circuit.

The ruling means that AT&T and its operating companies must comply with the injunction handed down by a U.S. District Court in December and begin connecting MCI customers with FX, CCSA and other facilities in the same way that these services are provided to the Bell Long Lines Division.

The original injunction had ordered AT&T to provide MCI customers with the contested facilities but connections were not made to customer sites by AT&T pending the outcome of the request for a stay.

Commenting on the court ruling, an MCI spokesman said it "would release for installation" a backlog of orders from customers waiting for service from local phone companies.

An AT&T spokesman said: "We are taking steps to comply with the injunction on the assumption that it will become effective."

### Interconnection 'Impairs Service'

WASHINGTON, D.C. – The interconnection of "certain kinds of customer-provided equipment" to the telephone network "impairs service," according to Robert D. Lilley, president of AT&T.

The Bell System is by no means persuaded that adequate measures can be established for eliminating "the present and potential dangers and impairments" that might result from continued interconnection, Lilley said in a recent speech.

He added that AT&T has evidence to support its position, although he described it as "not yet definitive but tending to the same conclusion."

Lilley said AT&T has called for a halt to the expansion of the specialized common carriers "until there has been a full exploration of the long-term consequences."

The major effect of the specialized carriers would be a waste of telecommunications resources stemming from a duplication of facilities. This in turn would mean higher charges to the average telephone user, he predicted, as competition "syphons off revenues that help meet the costs of basic [telephone] service."

### Correction

In commenting on its Diers software [CW, Feb. 20], Computeristics explained: "The DFHTEP supplied by IBM is merely a dummy program which takes no corrective action other than allowing the defaults generated by DFHTACP to be exercised."

# FCC Says State Regulatory Boards Can't Overrule FCC on Interconnection

WASHINGTON, D.C. – The FCC has ruled that state regulatory commissions do not have the right to make interconnection rulings that are in conflict with FCC actions.

Citing a proposal by Nebraska which would require certain users installing customer-owned equipment to be regulated as common carriers, the FCC said: "Under national policy all customers are free to obtain their own systems from any source and to interconnect them with the national [telephone] network subject only to reasonable requirements to prevent harm to the network."

The commission further said a recent ruling by the Oklahoma regulatory commission, which would have regulated certain types of interconnected equipment, was "in clear conflict" with the Communications Act and FCC policy.

The commission's decision is still subject to appeal and to reconsideration and it is expected that several of the affected state regulatory agencies will speak out on the issue.

### Uniformity Needed

If each state were free to establish its own rules governing interconnection for the purposes of intrastate services, uniform nondiscriminatory interstate service throughout the country would be difficult if not impossible, the FCC said.

The major conflict in the federal-state regulatory jurisdiction stems from the common facilities used for both intrastate and interstate services. Since separate lines do not exist for each type of service, the FCC has maintained the states do not have the power to take any regulatory action which would limit the rights of interstate users.

"It is one thing to exempt intrastate services from federal jurisdiction," the FCC said, but it is quite a different matter to argue that because of this exemption, common facilities used for both types of services should also be beyond federal jurisdiction. If this were so, subscribers would be subjected to separate terms and conditions in each of the 50 states on how they could access and use the telephone network for interstate services, the ruling said, describing such a situation as a "melange of regulations."


# There is no stronger shield than "Crashguard."

"Crashguard" is a tough oxide protection against headcrash damage. You get it from the people who developed the first computer tape in 1953. People who will go to any length to solve a customer's problem. People who thrive on assisting. The Data Recording Products Division of 3M. A proud clan.

# Call out the clan.

"Scotch" and "Crashguard" are registered trademarks of 3M Company.

3M COMPANY

## Test Set Checks High-Speed Links

PROVIDENCE, R.I. – International Data Sciences, Inc. has brought out a bit error rate analyzer designed to test high-speed data links up to 70M bit/sec.

The Model 3200 test set consists of generator and analyzer modules and interchangeable interface modules.

ECL, TTL, T1, T2 and V.35 interfaces are standard, with others available.

A generated bit pattern is applied to the interface module where the appropriate signal conversion takes place.

The analyzer module accepts a repeating pseudo-random bit stream and a timing signal from the active interface in a loopback or end-to-end arrangement.

Individual bit errors or bit errors per selected block size are displayed on a four-digit LED display.

The Model 3200, consisting of generator and analyzer modules and an ECL or TTL interface module, costs $6,500. Lease plans are available. Delivery is 90 days from the firm at 100 Nashua St., 02904.

## CRT Terminal Transmits Up to 9,990 Bit/Sec

BEDFORD, Mass. – Information Design, Inc. has brought out a Model 33 teletypewriter-compatible CRT terminal with screen capacity ranging from a standard 2,048 characters up to 3,072 characters.

The standard unit can transmit at rates rising at increments of 10 to 9,990 bit/sec, and optionally at 50 kbit/sec, a spokesman said.

Called the Keyview, the CRT screen uses a 5 x 7 dot matrix on a 12-inch diagonal screen. The display contains 32 line/screen, with 64-, 72-, 80- or 96 char./line.

The terminal uses standard Ascii code. The unit's cursor, a blinking underline, can be computer-controlled for character or line editing. Error checking is performed by parity.

The unit's keyboard is equivalent to a Model 33 ASR. Hard-copy printout via a teletypewriter or equivalent can be activated by either the operator or the CPU.

Standard interface is EIA-RS-232-C and optional interfaces include TTL and TTY current loop.

The basic Keyview, with 2,048-character screen capacity, costs $1,750 with delivery in five to six weeks from the firm at the Civil Air Terminal, 01730.



## Modem Replaces 5 Bell Data Sets

HACKENSACK, N.J. – Timeplex, Inc. has introduced a 300 bit/sec modem that is compatible with, or can replace Bell 103A2, 103E, 103F, 113A and 113B data sets, according to Timeplex.

All equivalent modem types can be configured in the field by changes in strapping, so that the unit does not become obsolete simply because of changes in system requirements, the firm said.

Available options include 2-wire, 4-wire, Bell CBS or CBT line interfaces; direct switched-network interface (tariff permitting); request to send carrier control; originate, answer, or automatic originate/answer modes.

Also included are disconnection by carrier loss, long space or DTR.

The basic modem costs $185 with delivery in 30 days from the firm at 100 Commerce Way, 07601.

## RFL Modem Aimed Mainly at OEMs

BOOTON, N.J. – RFL Industries, Inc. is offering a 1,200/1,800 bit/sec Bell 202D-compatible modem that is available with EIA, CCITT, DTL/TTL and positive neutral interfaces, according to the firm.

The modem, aimed primarily at OEMs, operates over a wide temperature range, and its total peak distortion, at 1,200 bit/sec back to back at 25°C, is typically 4%, the firm stated.

A carrier-detect-squelch circuit eliminates spiking at the end of a message, performing the same function as soft-carrier turnoff, but with faster turnaround, according to RFL.

The modem costs $245 in small quantities with delivery in 60 to 90 days from the firm at Powerville Road, 07005.

### AF Tests Speedy Modem

TAMPA, Fla. – A group-data modem able to transmit and receive at up to 153.6 kbit/sec has been successfully tested in Europe by the U.S. Air Force.

The AN/USC-26 modem provides high-speed digital data transmission capability over a group channel, according to Honeywell, which designed and built it.

## Bits & Pieces

### Cartridge Disk Cleaner Kit Provides Desk-Top Operation

HILLSDALE, N.J. – Disk cartridges for both the IBM System/3 (5440) and 2315 cartridge drive can be cleaned using the System 315 from Texwipe Co.

Price at $950, the 315 is said to reduce operating costs by eliminating the time lost when a read/write head is forced by scratches or dirt to shift to an alternate track. In addition, it insures a substantial safety margin by preventing surface debris from damaging the head and possibly the disk surface at the same time, according to the firm. The average cost to clean a cartridge is 15 cents, the firm noted.

Texwipe is at 51 Prospect Place, 07642.

### Minicomputer Institute Divided Into Three Separate Seminars

OAK BROOK, Ill. – Ten days in April should provide the minicomputer neophyte with a solid background in basic concepts, hardware and software engineering.

Starting on the evening of March 31, the Minicomputer Institute of the National Electronics Conference (NEC) will run three consecutive seminars on: basic concepts and applications; hardware, software and systems; and software engineering techniques.

NEC is a technology-oriented educational organization sponsored by universities and engineering organizations. The NEC registrar is at Oakbrook Executive Plaza #1, 1301 W. 22nd St., 60521.

### Shugart SA902 Provides Dual IBM-Compatible Drives

SUNNYVALE, Calif. – Shugart Associate's SA902 dual diskette drive is designed to be IBM compatible and provide independent data accessing media for systems requiring two drives.

The SA902 has random and sequential data accessibility with a two diskette total; storage capacity of 6.2M bits; a transfer rate of 250 kbit/sec and an asynchronous average access time of 250 msec per each spindle.

Unit prices start at $1,275. The company is at 335 Soquel Way, 94086.

### Pen Is OCR Non-Reproducible

AKRON, Ohio – A non-reproducing pen, specifically designed for use with optical character readers, is available from Portage. The green ink OCRiter is available for $2.40 per dozen through P.O. Box 5500, 44313.

### Graham Offers Floppy Diskettes

GRAHAM, Texas – Graham Magnetics now offers IBM 3740-compatible diskettes at $8 apiece in boxes in five or 10 units.

## A Look Toward 1985 – Part I

# Circuitry Gains May Have No Effect

By Vic Farmer
Of the CW Staff

CAMBRIDGE, Mass. – Users anticipating great strides forward in computer system price/performance over the next 10 years may be in for a shock.

Although bubble memories and laser devices may be incorporated into some applications by 1985, Arthur D. Little, Inc. (ADL) predicts the systems of 1985 will still use tape drives, disk drives and impact printers.

Furthermore, the expected sharp improvements in price/performance of circuits (logic and memory) will be largely offset by increased inefficiency caused by software designed to make systems more automatic and easy to use.

**AF Study**

That's a simplistic summary of a study over the past several months that the research firm conducted for the U.S. Air Force.

The Air Force contracted for the study to provide a solid view of the state of the art before it decided whether to update its nearly 150 air base data centers around the world during the next 11 years.

Frederic G. Withington, who directed the EDP equipment portion of the study for ADL, concluded that the next generation of computer systems will be made up of modular component computers of very low cost compared with current models.

"These component computers are likely to be combined into hybrid multiprocessor systems covering a wide range of cost and processing power, offering users a new order of utility and interactive capability," he said.

But he also warned that many users will not see any reduction in the cost per transaction of their equipment if they depend on the manufacturer's new levels of sophisticated software. The software overhead will chew up so much of the CPU power that the raw processing potential gained through the use of improved electronic circuitry will have little effect, but is not all that bad.

Perplexed users, harassed by the problem of complexity and lack of skilled personnel, may find the software overhead a desirable trade-off, he added.

Withington divides the users of 1985 into two basic groups: those who will stay with simple batch-processing environments and dedicated minicomputer applications, and those who will decide to use on-line data base systems and general multipurpose systems.

The first group will definitely reap the maximum value of the new technology by 1985, conceivably with a cost-performance increase up to 10 times that of today in the central processor.

The second group will sacrifice the improved cost performance to get easier to program, and run, multiprocessing and interactive systems. "Auxiliary storage subsystems will be available that make it economically possible to provide on-line access to groups of very large files. Substantial improvements in magnetic technology will make this possible by 1977; slow evolution toward magnetic-bubble and/or charge-coupled device technology will also cause improvement to continue through 1985 and beyond. Highly flexible, fully automatic data management software will be integrated with these subsystems," he said.

Withington said that the Grosch Law No. 1 from 1950 will not be violated and processor speed will climb exponentially as the square of the cost. But it does appear that Dr. Herb Grosch's corollary rule, "No matter how clever the hardware guys are, the software guys will louse it up," will also remain unchallenged.

*Part II will delve into the potential of the various peripherals covered in the ADL study.*

**Laser beam recorder system includes film processor, recorder and optional minicomputer-based controller.**

# 3M COM Recorder Uses Helium-Neon Laser Beam

ST. PAUL, Minn. – The Laser Beam Recorder (LBR) of 3M's computer output microfilm (COM) processor allows use of the heat-developing-type films previously restricted to film-duplicating systems. No liquid chemicals are required or used.

The LBR writes up to 60 kchar./sec directly on microfilm, forming a latent image that is developed by heat. The beam originates in a helium-neon laser of 6 mW and operates at room temperature. An acousto-optic modulator breaks the beam into zero-to-seven deflected beams to write on a 5 by 7 matrix.

The primarily off-line laser COM system reproduces the equivalent of two to five pages of printout per second on 16mm microfilm or 105mm microfiche that meets NMA and ANSI standards and can be used with other common formats, according to 3M. The system records on 16mm roll film in cine or comic orientation.

Standard reduction ratios are 25X, 42X and 48X. Output is on 3M LBR Dry-Silver film that is heat-processed off-line. Because the system is completely dry, it can be in-line in a DP environment.

The system accepts 7- or 9-track tapes from sources recorded at 200-, 556-, 800- or 1,600-bit/in. The system can be operated on-line to a selector or multiplexer channel of an IBM 360 or 370 computer and will interface with a minicomputer.

Ebcdic, BCD and Ascii codes are accepted and custom codes are an optional feature. ASA, 1401 and 360/370 machine control codes are standard; use of other codes is optional.

Priced at $2,470/mo on a one-year lease, the systems are scheduled for delivery in July. Purchase price is $120,000 for the typical system including controller, recorder and processor.

3M can be reached through P.O. Box 33600, 55133.

### Aluminum Stand Holds Paper Tape

PALO ALTO, Calif. – A nine-ounce aluminum holder is designed to support a punched tape of under four-inch diameter for teletypewriters. The holder, normally placed on the floor beneath the tape reader, is priced at $9.95 from Intronex, 991 Commercial St., 94303.

## Cataloging With COM — Part II

# Penney Puts Viewers on Dock

MILWAUKEE — As J.C. Penney's catalog sales grow, so do the DP department's need to rapidly disseminate up-to-date information to the right departments. The firm started using computer output microfilm in 1966 and depends heavily on its use throughout the catalog sales operation.

And microfilm and microfiche are not confined to an office environment at J.C. Penney. Microfiche viewers are located on two docks where an average of 200 shipments a day are received.

As each shipment is received, the receiving clerk in a matter of seconds can locate the microfiche containing the original purchase order covering the shipment. Using a 3M 400C viewer, the clerk produces a photostatic copy of the purchase order and then verifies the shipment noting any discrepancies from the original order.

The photostatic copy with the clerk's notation then becomes input for further processing. The input is keypunched and the computer updates the status of the purchase order, logs the shipment into inventory and disburses payment to the supplier.

Another "non-office" use for microfiche is in the area of inventory control. "With a two million square foot warehouse and more than a half million items ranging from transistor radio batteries to evening gowns to refrigerators, we needed a simple system that persons in the warehouse could handle," said Bernard Gomon, manager of J.C. Penney's catalog data processing centers.

Each day, two microfiche files are produced for use in the warehouse. One set is organized by stock number and contains a description of the item, the location of the item in the "picking" area, the location of backup stock in the "holding" area, the amount of stock that should be on hand in each area and the reorder level. Although reordering is automatically handled by the computer, this information serves as a convenient safeguard against out-of-stock situations.

The second set of microfiche is organized by control numbers — which are the numbers assigned to the bin or location of the item. "Although each shelf and item should be clearly identified, if an empty bin is spotted by one of our pickers, we can easily identify the stock number of the missing merchandise," Gomon said.

These two microfiche files are used for several purposes. On the receiving dock, after a shipment has been recorded as received, the clerk assigns location numbers to each lot of items, using the stock number from the purchase order. The shipment is then routed to its specific location within the vast warehouse. In the event the item is a "hot" item, the minimum bin inventory will be immediately delivered to the right location.

In the picking area, computer-generated picking labels are sequenced to correspond to the location of the stock. A picker simply walks up and down aisles at a steady pace rather than jumping from aisle to aisle.

Another use for the microfiche file is returned merchandise. The returned merchandise is reassigned its stock number and is returned to its proper bin or location as shown on the microfiche. The same procedure is used to replenish stock in the picking areas.

# 155 OR 158?

That's the decision faced by many users of large IBM computers. It's a tough decision, but Cambridge makes it even tougher. Because our 370/STOR 155 add-on memory has features that can make your Model 155 processor perform like a 158 – and then some. Take a look at the checklist – and then make your decision:

| MODEL 155 with 370/STOR | | | MODEL 158 from IBM | |
|---|---|---|---|---|
| YES | NO | | YES | NO |
| ☑ | ☐ | 1. Four megabytes of main storage capacity | ☑ | ☐ |
| ☑ | ☐ | 2. Dynamic address translation features | ☑ | ☐ |
| ☑ | ☐ | 3. Up to 30% more CPU cycles than Model 155 | ☑ | ☐ |
| ☑ | ☐ | 4. High-speed addressing of main memory | ☑ | ☐ |
| ☑ | ☐ | 5. Use of either VS1 or VS2 operating system software | ☑ | ☐ |
| ☑ | ☐ | 6. 25% less physical floor space than Model 155 from IBM | ☑ | ☐ |
| ☑ | ☐ | 7. Virtually no conversion or installation costs | ☐ | ☑ |
| ☑ | ☐ | 8. No additional storage adapter required for expansion | ☐ | ☑ |
| ☑ | ☐ | 9. Ability to reconfigure main memory | ☐ | ☑ |
| ☑ | ☐ | 10. 35% less costly than a Model 155 with all – IBM hardware | ☐ | ☑ |

That's what 370/STOR 155 can do for your installed Model 155 processor. We almost turn it into a 158 – and then some – for about one-third less than it will cost from IBM.

Sure, your decision is tougher now. Or is it?

**CAMBRIDGE.**

A good place to put your information.

**360/CORE**

Up to two megabytes of main memory for Models 22, 30, 40, 50, 65 and 67 processors in the System/360 line.

**370/STOR**

Up to four megabytes of main memory for the Models 145, 155 and 165 in the System/370 computer family.

**EXPANDACORE-11**

Memory expansion systems for all PDP-11 processors, featuring up to 30% speed increases. Two-way data save and interleaving.

**EXPANDACORE-620**

Up to 65K of main storage for all 620/i, L, F-100 and L-100 minis. Self-contained and self-powered 5¼" plug-in systems.

**OTHER MEMORIES**

Core, semiconductor and DOT data storage systems for OEM and End-user computer mainframe, controller, peripheral, terminal and auxiliary memory products.

cmi CAMBRIDGE MEMORIES, INC., 696 Virginia Road, Concord, Mass. 01742 (617) 259-9880

# One Who Should Know Offers 12 Rules for a Safer DP System

LOS ANGELES – Jerry Schneider, convicted computer code cracker in the theft of equipment valued at $1 million from Pacific Telephone Co., is now a DP security consultant here.

Recently he came up with the following 12 rules for businessmen who want to protect their companies from losses through the unauthorized use of their computer system:

1. Limit the number of employees with access to terminals, tapes and printers to as few as possible.

2. Screen job applicants keeping in mind the profiles of perpetrators of previous computer crimes.

3. Rotate programmers and other staff so that no one has too much time to successfully commit a crime.

4. Separate the operating and programming functions so no one person does both.

5. Change passwords and access codes frequently, especially when there is a high turnover of employees.

6. Restrict and monitor all attempts to gain access to a system.

7. Randomly monitor processing in an open and public way, . . similar to the technique of using a police cruiser on a patrol. This lets everyone know all work is being checked.

8. Keep detailed time usage records that will show if an application suddenly starts to take unexplainable extra run time.

9. Scramble data mathematically to make stored data difficult to use by unauthorized people.

10. Guard files and programs with adequate safeguards to make use of special programs, without authorization, difficult or impossible.

11. Set up identification code systems to record who uses the system.

12. Screen or investigate the security procedures and operations of vendors that supply time, programs or equipment.

Schneider's firm is EDP Security, Inc. and is at 1880 Century Park East, 90067.

### Board Helps Schedule DP Time

MENDON, N.Y. – Scheduling computer time in a DP center may be helped with a scheduling kit that uses magnetic strips on a 3 ft by 4 ft wall panel.

The strips can be scissor-cut and the job identification can be handwritten and erased. Strips are supplied in eight colors which can be used to code the types of jobs.

Repetitive jobs can be shown on the magnets with stick-on vinyl letters and numbers. The strip length shows the job time span.

Kits are available for scheduling from 18 days to 44 days and from 10 hours daily to around the clock, and are priced from $139 to $389 from Magnatag Products located on the Pittsford-Mendon Road, 14506.

A Computerworld Special Report
February 27, 1974

# Charting a course with Data Base Management Systems

**In his Turing Award speech last August, Charles Bachman described how data base management systems can turn programmers into navigators, free to plot whatever paths they need to solve particular application problems, without concern for file structures, access methods and other machine-based constraints.**

**But even the most seasoned navigator plots his course and plans for possible problems before he starts his journey. He knows what tools are available to help him in his work.**

**This special report examines various aspects of using data base management systems and documents actual user experience – in summary and in a case study. The section ends with a recap of where and how users can get more information about data bases and their management.**

**Good sailing.**

## On the Inside

# Data Base Systems Wave of the '70s

## *Gaining Acceptance as Means To Unify Multiple Applications*

By George Schussel
Special to Computerworld

Data base management systems (DBMS) are becoming the standard of the 1970s in the same way Cobol became the standard of the 1960s. In 1970 there were perhaps 100 users of DBMS in the U.S. Today that number is anywhere from 800 to over 1,000. With Codasyl setting broad standards and most vendors following suit, the use of DBMS to control large data bases and provide information to multiple users has already gained acceptance as a fundamental principle in DP.

The use of DBMS to control a data base for multiple applications can be easily contrasted with second- and third-generation file management techniques that used master files specifically designed for one application. This approach is a two-layer sandwich – the top layer being the application and the bottom layer the data sets, data files and master files that go with the application.

In contrast, the DBMS approach is a three-layer sandwich – the top and bottom the same, but with a middle layer that interfaces the two. This middle layer is the DBMS, and it's structured in such a way that the application program does not physically retrieve data from the data base but issues calls to the DBMS which does the storing and retrieving.

The application only needs to know the name of the data. No knowledge of physical storage is required since the DBMS has this information and does the actual physical retrieval.

Of course, no piece of software performs the above function entirely by itself; in fact what the DMBS does is retrieve data physically based upon descriptions of the data that have been given to it by the data base administrator, the individual responsible for coordinating access to the entire data base.

### Data Base Definition

A data base can be defined as an integrated source of data which services a community of users and is controlled by a DBMS. Most experts in the field would accept any systems approach having these characteristics as being a data base.

While the points above are a minimum for a data base, many applications have additional characteristics. Perhaps the most striking characteristic is that of data storage on disk rather than tape files. This is important since efficient use of most DBMS requires relatively uniform access speeds to all elements in the data base. Tape, of course, can't provide this characteristic.

The fact that these systems use disk, however, is a passing phenomenon. When the next generation of secondary technology comes along, be it laser, bubble memories or whatever, data bases will go to this technology.

Another important characteristic of most data bases is the existence of a data base administrator. In most companies this is a group composed of a small number of highly competent individuals that have responsibility for the data, its definition and integrity; the structure of the data base itself and the determination of which access methods and file organizations are to be used for efficient retrieval; and in many cases the maintenance of the software itself.

Many users have found that the data base approach to implementation of systems can offer many advantages over standard file approaches:

- **Live Versus Dead Data** – The data base approach says, "We'll store our data in one place; we'll be very careful about how it's updated and who accesses it; we'll make sure it's of high quality; we'll publish a dictionary and distribute copies to everyone who has any interest; and we'll encourage reuse of the same data element in different systems applications."
- **Saving of Programming Time** – Use of a data base removes most problems of file de-

*(Continued on Page S/4)*

| System | Vendor | Equipment | Core Required (Bytes) | Number of U.S. Installations | Purchase Price |
|---|---|---|---|---|---|
| IMS-II, IMS-DC IMS/VS | IBM | IBM 360/370 | 90K - 350K | 400 | $550 - $1,550/mo Lease only |
| TOTAL | Cincom Systems Cincinnati, Ohio | IBM 360/370 H200/2000 Univac 70 | 8K - 35K | 400 | $26,500 - $34,500 |
| System 2000 | MRI Systems Austin, Texas | IBM 360/370 Univac 1100 CDC 6000/Cyber 70 | 130K | 60 | $35,000 - $130,000 |
| Adabas | Software AG Reston, Va. | IBM 360/370 Univac 70 | 110K | 25 | $120,000 |
| IDMS | Cullinane Boston | IBM 360/370 Univac 70 | 50K - 65K | 10 | $30,000 |
| Metabase | PMI New York | IBM 360/370 | 50K - 75K | 10 | $28,000 - $72,000 |
| IDS | Honeywell | H6000 | 50K - 240K | 100 | Bundled |
| DMS | Xerox | Sigma 5, 6, 7, 8, 9 | 35K | 35 | Bundled |
| DMS/1100 | Univac | Univac 1100 | 60K | 25 | Bundled |
| DMS/6700 | Burroughs | 6700, 7700 | 150K | 10 | $70,000 - $100,000 |
| DBMS/10 | DEC | Decsystem-10 | 32K - 80K | 10 | $15,000 |

**Chart describes some of the data base management systems available.**

## Heavy Planning Needed, Survey Finds

# DBMS Users Satisfied, but Transition Can Be Rough

By Patrick Ward
and Toni Wiseman
Of the CW Staff

NEWTON, Mass. – Users of data base management systems (DBMS) are generally satisfied with their relatively expensive software and are confident the packages can do the work for which they are intended.

Each package has its satisfied users, but the transition to reliance on DBMS can be rough, a *Computerworld* survey found. Vendor support is generally available and appreciated, yet one user admitted his use of IMS II before IBM really had enough people to help him made him more knowledgeable and self-reliant about his system than he would have been otherwise.

Most of the users contacted said they were redesigning existing systems or creating completely new ones to take advantage of the data base capabilities. The shift is not as simple as a move from one operating system to another; heavy planning has to be a part of this changeover.

### First Efforts Simple

Many users eased into DBMS by working with one or two applications at first, and then moved more confidently into other areas. Sometimes these first efforts were simple, low-volume applications that wouldn't damage things if they went wrong. Sometimes, however, users jumped into a vital application to reap the anticipated benefits of DBMS as soon as possible.

Few, however, had the courage of Abbott Laboratories, which converted about 20% of its applications to Cullinane's IDMS in one fell swoop. In this case, Kenneth Carleton explained, Abbott's work fell into two logical business units, and the DP staff had to convert either the 20% they chose to handle or the other 80% at one time.

Some of the users have already recognized that certain applications are inappropriate for the data base environment, and they won't be converted at all. "I'm not going to put everything under IMS just because I have the system," said Joel Rouleau, director of information services at Collins & Aikman, Charlotte, N.C.

About 70% of the users reported they have someone with the title of data base administrator, or its equivalent, at their installations. There seemed, however, to be some differences in the work they did and the control they exercised from site to site.

The DBMS effort has to be a serious commitment, the survey found. Most of the users appeared to agree with one of their number who said he was his firm's entire DBMS staff: "My biggest recommendation to anyone who goes [to data base], regardless of what the system is: don't shortchange it. If you're going to spend those bucks, and it's going to have a real impact on your organization, worrying about staffing overhead is foolish."

Somewhat more than 60% of the sites already use or are planning to use data dictionary/directory systems in support of the DBMS itself. Somewhat surprisingly, 60% of the users going in this direction have developed the dictionary/directory software in-house.

### Rating Packages

User thoughts about the various systems seemed to follow patterns. IMS managers, for example, often complained about the complexity of the system and about its heavy core usage. But they were just as likely to speak highly of the broad range of facilities they had available to them because of the "complexity" of the IBM system.

Users of Total, from Cincom Systems, tended to wish for better support of sequential files and many had gone to independent software houses or their own in-house staff to gain an inquiry ability for use with the system. They liked the people at Cincom and the availability of the problem "hot-line," but were quick to note that the problems they encountered were in understanding the manuals, not in software bugs.

Software AG's Adabas has advantages in ease of use and in efficiency, users remarked. Computer overhead was mentioned as a possible disadvantage, but users felt this was not unique to their particular DBMS. As with many of the non-IMS and non-Total users, Adabas users tended to choose their systems after comparative evaluations.

System 2000, developed by MRI Systems, led many of its users to reductions in personnel and development cycle overhead, and they often cited the system's command language as useful in giving non-DPers direct use of the data controlled by the system. Operating costs and machine overhead were cited as drawbacks by some.

The sole IDMS user contacted said he would definitely choose the same package again. He felt the support hadn't been as good as a larger software house might have been able to supply, but then admitted he had only limited need for support so far anyway.

If he had it all to do over again, he said, he would probably try to have the contract rewritten a bit to provide stronger support for his company and to give him "that warm tummy feeling."

Stepping into DBMS without a lot of planning is not the way to get that feeling, the survey made clear.


**'I Must Say I Admire Your Ability to Keep Up Your Spirits Despite the Pressures'**

# '70s to See Data Bases Controlling Multiapplications

*(Continued from Page S/2)*

sign and access strategy from application programmers, and results in a savings in programming time for developing applications. Also, by using standard RPG modules which have been interfaced to your DBMS, you can write reports using less time and effort than in Cobol.

- **Nonredundancy** – The data base approach eliminates this problem by definition. Some savings are picked up by reducing storage requirements.
- **Processing Ease** – Being disk-oriented, many functions normally controlled by operators in a tape-processing environment are internally controlled by the computer and DBMS in a data base environment.
- **Flexibility/Adapability** – Because all data is defined in a data dictionary and is easily, logically accessible, the implementation of new systems or ad hoc programs to respond to one-time requests is much easier in the data base environment.
- **Standards** – Perhaps one of the most significant differences in the DP shop of the 1970s, compared with that of the 1960s, is the greater use of standards and documentation. DP managers have come to realize that good readability and the implementation of effective standards in programs are extremely important. The data base approach, by standardizing the file-access methodology goes a long way toward making standard approaches to systems implementation more achievable. The result is better control.

All is not honey with the data base approach, however. There are a number of problems that the prospective user needs to understand before he moves into the data base environment:

*"The interest in data base management systems is there and the trend toward data base is strong and irreversible. In spite of its problems, most people who become familiar with the concept feel data base advantages are worth the price."*

- **Personnel** – Many companies are anxiously trying to get data base systems up, and the number of trained personnel comes far short of meeting demands. As a result, salaries are high for people who have this type of experience, and most users have had to develop trained personnel from their own internal staffs.
- **Disk Versus Tape Expense** – On-line processing today means the storage of much, if not all of your data on disk; and, unless there is high repetitive usage of data elements, the use of disk instead of tape results in higher computer expenses.
- **Overheads/Larger Computers** – The additional expense of disk versus tape is just one of several overhead factors. With DBMS, the work is transferred from the application programmer to the computer, resulting in more computer overhead both in CPU cycles and main memory.
- **Systems Supports Programmers** – A DBMS needs to be supported, have application standards developed and be interfaced by programmers. This usually results in one or more system support-type software programmers just to maintain the DBMS.
- **Malfunction/Recovery** – Techniques for recovering from hardware/software malfunctions in the data base environment are well known, but generally require more work and computer time than recovery in a tape-oriented environment. The basic reason for this is that normally a large amount of information is on-line at any one time, and recovery of this information involves restoring disks from back-up tapes and updating those disks from journal tapes.
- **Security** – When applications were developed by using separately located tape files for each application, security was available almost on an automatic basis. The whole approach of the data base environment, however, is to put all data in one integrated location, publish its definition and generally provide excellent accessibilty to it. Correspondingly, attention must be given to the problem of security in terms of preventing unauthorized individuals.

**Whatever Your Needs . . .**

DBMS packages are normally sold as batch-only systems. Other packages are then interfaced to the DBMS to give additional capabilities as needed. If you want data dictionary capabilities, you buy a package for that. As you want to get away from straight Cobol reports into the shorthand RPG-types of capabilities, you buy an interfacing RPG package.

If you wish to query your data base from terminals, then you can get query capability; and, even more generally, if you want to make sure that you have on-line access, you buy a teleprocessing package.

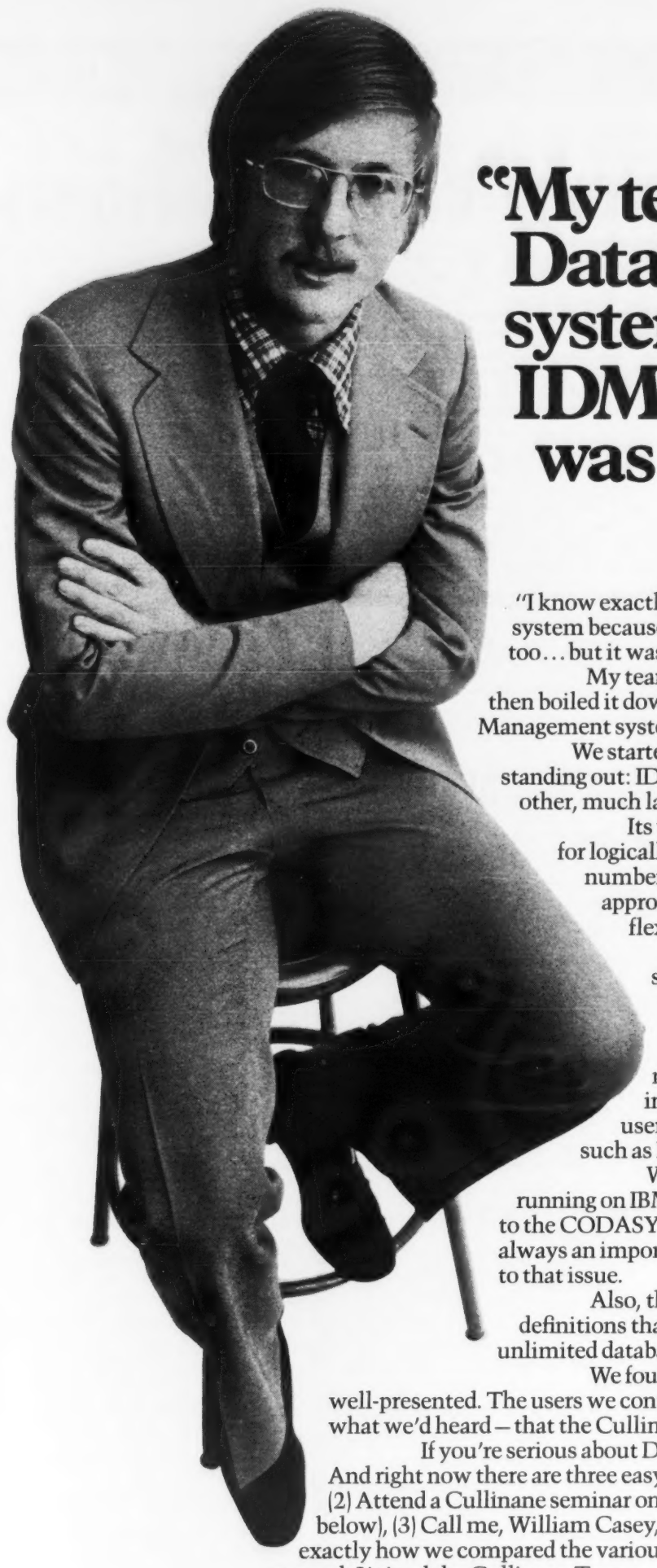
The interest in DBMS is there and the trend toward data base is strong and irreversible. In spite of its problems, most people who become familiar with the concept feel data base advantages are worth the price.

It's probably not too brash to forecast that by 1980 the implementation of business-oriented systems on data bases will be assumed as a de facto standard in the same way that by 1970 the use of Cobol for such implementations was assumed.

*George Schussel is vice-president of American Mutual Liability Insurance Co., Wakefield, Mass., course director of the Advanced Management Research (AMR) seminar on data base management systems and author of numerous articles on the same subject.*

**Who's Responsible?**

**This special report was coordinated by Don Leavitt, *Computerworld's* Software Editor for the past four years.**



# "My team evaluated every Database Management system going. We picked IDMS and the choice was easy. Here's why."

**William Casey***

"I know exactly how you feel about choosing the right Database Management system because I've done it. You think it'll be a tough decision. We thought so too... but it wasn't.

My team (from a large insurance company) surveyed the entire field, then boiled it down to five Database Management systems and two File Management systems.

We started out completely impartial. But from the first one system kept standing out: IDMS. It offered many features that simply weren't available on other, much larger, systems, yet it had an overhead figure of only 50 K.

Its variety of data placement techniques, its unrestricted facilities for logically relating all data under its control, its provision for an unlimited number of database entry points, and its superior space management approach amounted to both a substantial performance edge and a flexible database architecture advantage.

With data independence established by means of separate schema and subschema compilers, we realized that many applications programs would no longer depend on data definitions they themselves employed.

From a programming point of view, the system was miles ahead of its competition. Example: IDMS's DML processor inserts all necessary data record descriptions directly into the user's COBOL program and allows use of database-oriented verbs, such as FIND, OBTAIN, or STORE.

We were pleased to find that IDMS is the only system currently running on IBM (OS and DOS) and Univac Spectra equipment that corresponds to the CODASYL DBTG specification of April 1971. Machine independence is always an important consideration, and IDMS represented the perfect answer to that issue.

Also, the IDMS/CULPRIT retrieval system, running from the same data definitions that the user established to create his database network, provides unlimited database access facilities for reporting purposes.

We found the documentation was beautifully done – complete and well-presented. The users we contacted were most enthusiastic about the system and confirmed what we'd heard – that the Cullinane Corporation has an outstanding reputation for support.

If you're serious about Database Management you have to look seriously at IDMS. And right now there are three easy ways to do it: (1) Write or phone for a technical brochure, (2) Attend a Cullinane seminar on IDMS at the Computer Caravan city nearest you (see schedule below), (3) Call me, William Casey, and if my travel schedule permits, I'll personally show you exactly how we compared the various choices and why we picked IDMS. You see – I liked IDMS so much I joined the Cullinane Team.

| CARAVAN CITY | EDP-AUDITOR/CULPRIT SEMINAR (3:30-4:30 PM) | IDMS SEMINAR (9 AM-Noon) |
|---|---|---|
| Washington | Feb. 21 | Feb. 22 |
| Cincinnati | Feb. 27 | Feb. 28 |
| Houston | March 6 | March 7 |
| Anaheim | March 20 | March 21 |
| San Francisco | March 27 | March 28 |
| St. Louis | April 4 | April 5 |
| Chicago | April 10 | April 11 |
| Boston (Woburn) | April 16 | April 17 |
| Charlotte | April 24 | April 25 |
| New York | May 1 | May 2 |

***About William Casey**

*A Magna Cum Laude graduate from Lafayette College who also attended Webb Institute of Naval Architecture, William Casey has extensive experience in systems design, programming and implementation of large systems.*

*Now a member of the IDMS technical team, he was responsible for developing the special versions of the EDP-AUDITOR/CULPRIT retrieval systems for use with IDMS.*

Cullinane Corporation

# Cullinane Corporation

One Boston Place, Boston, Massachusetts 02108. Phone: (617) 742-8656

## Position Critical to System Success

# Wanted: Superstar to Act as Data Base Administrator

By Edwin F. Kerr
Special to Computerworld

Judging from what has been written regarding the expected abilities of the data base administrator, leaping tall buildings in a single bound will probably be included in the job description. Seriously, however, the job of data base administrator is a critical position with unusual responsibilities that were not traditionally required for application-oriented system design activities.

The reason for the unusual responsibilities has to do with the difference between traditional file management and data base management approaches to systems. In general, a traditional file system is function-oriented while the data base system is data-oriented. The data associated with the execution of programs using traditional file management concepts are carried in files directly associated with the programs . . . application . . . functional area.

In contrast, the data base management systems (DBMS) approach is data-oriented in that the data base is common to many functional areas. Once the data base has been established, the next step is to design and implement the programs.

It is apparent by the very nature of the data base management approach that some means must be devised to coordinate the information requirements of the functional areas so that systems can cross traditional boundaries and serve the needs of the company rather than parochial interests. New communication lines between projects must be established and used often, and changes to the data base must be administered, coordinated and controlled.

One question that naturally arises with DBMS is that of ownership of data. Data is owned by the company and used by functional areas which retain a degree of authority over its use and disbursement. Data base management systems do not change this authority.

The term "data czar" is, therefore, a misrepresentation. The administrator's function is basically "custodial" in nature and consequently the implication of data ownership should be avoided. The function does have authority to enforce standards, documentation, data definitions, access methods and other decisions related to control, organization, security and integrity of the data base.

### Chicken or Egg?

Another question arising from DBMS use is which comes first, the decision on where the function reports or what the function will be. One approach is to analyze the organization, its reporting structure, its role, its goals, its relationship with other departments and its functions. Then perform a job analysis and determine what tasks and functions are performed by each position.

At this point, reintroduce the organization. Many times it will be discovered that the job functions and/or organization structures should be modified. The major point here is that dogmatic statements as to where the function should report and what it shall do must be tempered by the flavor of the organization.

In an organization where data processing is a separate entity and has corporate status equal with the other functional areas, the data administrator can effectively report to the highest full-time DP level. I am equally convinced that the function should not report to the manager of systems and programming.

If the department reports to a functional area (i.e., controller's department) then a case can be built to plan the data base administration functions outside of DP. In most cases where companies are considering data base systems, the former is the prevalent situation.

The functions of the data base administrator also vary depending upon the organization. But the overall purpose and scope of the function is to provide guidance, coordination, administration and control over the data base and the programs that use it. It follows that there is interaction with user departments, systems and programming and operations. Specifically, the data base administration functions are:

- Work with DP management and corporate management to establish whether there is a need for a DBMS.
- Work with DP management to advise

*(Continued on Page S/7)*

# A Day in the Life of a DBA — Many, Varied Functions

One data base administrator has this job description:

- Administration Activities — The DBA has overall responsibility for the coordination of company policy, application planning, and the DBMS constraints with all company departments. The main, and probably the most important requirement of the DBA will be that of a diplomat to keep the communication lines open between the various departments and provide assistance and guidance as required. This responsibility cannot be delegated to the technical staff, as is the case with other activities.
- Design Activities — The DBA has responsibility for standard data definitions, the data base dictionary and the data base itself. Design includes the data structure of the whole data base(s) as seen by all application programs, the storage structure and the mappings between them. Design also includes search strategies to be used, user membership rules, record relationships, backups, data compression techniques and teleprocessing interfaces.

The DBA has the design responsibility for a security system to guard against penetration, unauthorized update or copying, inadvertent disclosure, removal or destruction of the data base.

Another area of major design responsibility is that of system integrity to guard against inaccurate, invalid or missing data, and to flag suspected data.

- Operations Activity — The DBA has responsibility for creating and reorganizing both the data base dictionary and the data base itself. In creating the data base or multiple application-oriented files, he has responsibility for getting all data conflicts cleared up. Other operation functions include the integrity procedures (logging, dumps, audit trails, checkpointing and recovery), the allocation of files as required and control of the data base use during recovery, testing of programs or upon evidence of user conflicts.
- Monitoring Activities — The DBA has responsibility for monitoring the DBMS. Monitoring has to do with measuring performance of such areas as configuration, physical storage devices, integrity routines, security procedures, response times, use of resources, etc.
- Audit Activities — The DBA has a responsibility for determining compliance with established standards for the use of the DBMS.
- System Improvements — Any computer system will require constant improvement. The DBA has a responsibility for upgrading the DBMS software backup procedures, recovery procedures, teleprocessing response time, etc., as warranted. This task will be accomplished by reviewing the results from audits, monitoring statistics, operational difficulties, etc., and then initiating the corrective action.

## Wanted: Superstar To Run Data Base

*(Continued from Page S/6)*

and counsel on the selection of software (DBMS-OS) and hardware.

- Work with DP management to establish and enforce policies, procedures and standards for the installation and use of the DBMS.
- Work with DP management and user management to identify the content and define the organization of the data base.
- Establish and control a "data dictionary" and standard definitions and formats for common data, and develop a means to cross reference data in order to provide the systems developers with information regarding data availability.
- Determine the strategy for allocation of physical storage, establish and enforce access to the data base, assure integrity of the data base, and establish recovery, backup and disaster procedures.
- Provide a means to gather usage information and analyze and evaluate statistics relating to performance and usage of the data base.
- Work with the systems development project teams and users to ensure the best possible integration of the data base across application areas and to consult on data base design strategy and technique to ensure efficient use of the data base.
- Work with technical staff members and users to educate them in the concepts and technical areas of the data base.

It is evident from the nature of the activities that the data base administration function requires a very strong technical as well as better than average managerial capability. This will be difficult to find in one person.

For the larger staffed function, the problem is less critical because the responsibilities will be divided. In either case, the nature of DBMS requires that the data base administration function be filled early in the game with very capable personnel.

Look for people who can leap tall buildings even if they need a running start.

*Edwin Kerr is executive vice-president, Q.E.D. Information Sciences, Inc., Wellesley Hills, Mass.*


**'So Fight Over Me — It's Delightful'**

# The Prime Computer

## A totally new way to buy, use and upgrade computer systems.

The Plan introduces the first two-year guaranteed trade-in schedule. This program fully protects your computer investment when it's time to expand. Grow as much and as fast as you wish. The Plan will back you all the way.

The Plan protects your budget by eliminating arbitrary system packaging. You only buy what you need. With 3 discount schedules, you need pay as little as possible.

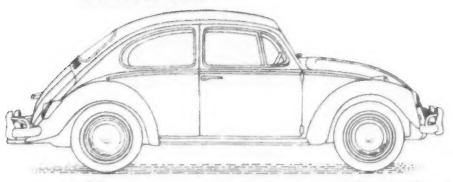
The Plan also protects your software investment. Only Prime offers upward *and* downward system compatibility. Without modification.

The Plan offers a whole new maintenance procedure, too. Built-in integrity checks can isolate a fault to a circuit board and maintenance is as simple as replacing the board.

There's even a program called Air Spare. It's fast delivery of a backup board and low-cost repair of the defective one.

Everything we offer at Prime, hardware, software and support, works together as a logical system, be it large or small. You can put together a powerful, reliable, easy-to-use computer system at a better total system price than ever before possible. The Plan shows you how.

Read on.



**Plan on a guaranteed trade-in**

You can start your system with any Prime Computer. If, for any reason it isn't the best one to handle expanding applications, trade it in. Trade all of it or parts of it. Trade whatever is standing between you and better performance.


For instance, to upgrade from a Prime 200 to a 300 processor, simply trade in the original processor board. You can then plug in a fully equipped* Prime 300 for $5000 (less a 50% trade-in credit for certain optional features on the original processor).

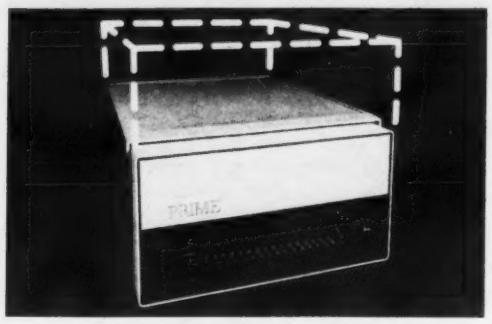
You can also elect to keep the original processor as a spare. The cost is only $1000. Keep your original power supply, memory and chassis, too. Or selectively upgrade any of them under similar trade-in arrangements.

Of course, all the software written on the original system

*Standard features include: virtual memory, restricted execution mode, memory protection, byte parity, extended direct addressing, integer multiply/divide, direct memory access system, automatic program loaders and microverification.

# User Plan.

will run on the new one without modification. Only Prime makes this possible. Only the Prime Plan guarantees it.



**Plan on unheard of compatibility**

*You can write real-time and time-independent programs on any Prime processor, in any language, under Disk Operating System control, or as stand alone programs, using a common set of support packages. You can then execute the developed programs on the same or any other Prime processor under Disk or Real Time Operating System control, or as stand alone programs—without modification. Furthermore, the Prime 300 supports a multi-user, virtual memory version of the Disk Operating System (DOS VM) and a foreground/background version of the Real Time Operating System (RTOS VM).*

| Choose Any Processor | Choose Any Development System | Choose From Support Packages |
|---|---|---|
| 100<br>200<br>300 | DOS<br><br>Stand-Alone | File Systems<br>Libraries<br>Utilities<br>IOCS Drivers |

| Choose Any Language | Choose Any Operating System |
|---|---|
| Macro Assembler<br>FORTRAN<br>BASIC | DOS<br>RTOS<br>Stand-Alone |

**Plan it right, right off**

The right combination of computer resources are all here and they're yours to select.

Pick a processor. Enhance it with options if you wish. Select memory size and speed. Add peripherals and controller.

| | | PROCESSOR | | | | | |
|---|---|---|---|---|---|---|---|
| | | 100 | | 200 | | 300 | |
| Memory | First Increment | 4K | 8K | 4K | 8K | 8K | 8K |
| | Cycle Time | 1 μsec | 1 μsec | 750 nsec | 750 nsec | 750 nsec | 600 nsec |
| | Parity | no | no | yes | yes | yes | yes |
| Chassis | 5 Slot | x | x | x | x | | |
| | 10 Slot | x | x | x | x | x | x |
| | 17 Slot | x | x | x | x | x | x |
| Features | Battery Backup | x | | x | | x | |
| | Automatic Prog. Load | x | | x | | x | |
| | Direct Mem. Access | x | | x | | x | |
| | Integer MUL/DIV | x | | x | | x | |
| | Extended Direct Addressing | | | x | | x | |
| | Microverification | | | x | | x | |
| | Single Precision Floating Point Arith. | | | x | | x | |
| | Double Precision Floating Point Arith. | | | x | | x | |
| | Writeable Control Store | | | | | x | |
| | Virtual Memory | | | | | x | |

Then package the electronics in the right size chassis and you're done. We'll provide the right power supply to handle whatever you put together.

There are no arbitrary restrictions. No surprises, either. With the chart above you could start planning now.

**Plan on running full time**

Prime service is every bit as sound as its technology. It's just as inventive, too. For instance, you can pick a full service contract or choose to use our services only when required. In either case we maintain a nationwide network of service and customer service representatives. They're ready to help.

We even have a way to hold maintenance costs to an absolute minimum. We call our idea Air Spare. For $200 we'll loan you a spare (processor, memory or controller). We'll then repair the faulty unit while you keep on running. And better than running, the whole replacement is handled by air express.

Read more about it in the Plan.

**One more thing to plan on**

The Prime Computer User Plan is a unique and remarkably logical document. You've just been treated to a sampling here. For the first time you'll know everything to expect in a computer system. Read the Plan. Send for it today.

To: Prime Computer Inc.
23 Strathmore Rd.
Natick, Ma. 01760

☐ Send the Plan
☐ Send Planner
(He'll call for an appointment.)

Name

Title

Company

Address

City State Zip

PRIME

# Codasyl Outlines Format For Data Base Languages

By Mike O'Connell
Special to Computerworld

The number of data base management systems offered by vendors who have followed the Codasyl specifications continues to grow and shows no sign of slowing. There are currently at least six such systems commercially available, and at least two large users are developing their own in-house systems. There is no other set of data base management systems concepts implemented by more than one vendor.

Codasyl began as an informal voluntary group of companies and their representatives who first met in 1959 to work on the problems of language compatibility between different computer systems. The early members represented computer vendors, users and government agencies; today's members represent the same interests, and the number of computer vendor members has grown as the number of computer vendors in the marketplace has grown.

### Cobol the First

The first and most famous set of specifications that came from Codasyl was for Cobol. In the years since 1959, Codasyl has continued to develop and maintain its Cobol brainchild. In 1965, it became apparent to Codasyl that business data processing shops needed to have access to large data bases, so it formed the Data Base Task Group (DBTG) to develop a set of language extensions to Cobol to do just that.

*Because there are no restrictions on how many sets a record can belong to, the user can define a large number of simple sets so the data base, when viewed as a whole, can be seen to consist of complex trees, networks, chains, rings or any other structure. The applications programmer, on the other hand, sees only those simple sets of concern to him.*

The DBTG recruited members from that small group with any experience with data base management at that time, and in early 1968 they concluded that their approach was wrong.

Instead of developing a data base facility for Cobol, the DBTG felt the problems of data base management required an approach from the overall DP viewpoint first, and from the application language viewpoint afterwards. The DBTG's parent committee, the Programming Language Committee (PLC), agreed. So work began in earnest to produce a set of language facilities to describe the content and structure of a data base, to describe what that data base would look like to an application program, and to describe how an application programmer would manipulate that data base.

### Three Languages Pushed

The first language specifications published by the DBTG came in 1969. PLC studied those specifications and sent the DBTG back to work on improvements. In May 1971, the DBTG returned with its final report to PLC.

That report advocated the development of three families of languages: the first family consists of one language only (the Data Description Language); the second family consists of one language for each existing programming language (the Subschema Data Description Languages); the third family consists of extensions to each existing programming language (the Data Manipulation Languages).

*(Continued on Page S/11)*

# Codasyl Committee Specifies Data Base Language Facilities

*(Continued from Page 10)*

Under this approach, the data base administrator in each shop would use the Data Description Language to describe the actual content and structure of the shop's data bases. Then, for each subset of the data base that an application program needed, he would use one of the Subschema Data Description Languages (the one corresponding to the language used to write the application program) to describe how the application program would see its piece of the data base.

Finally, the application programmer would use the facilities of the Data Manipulation Language extensions in his programming language to read, write and search the data base.

The data base structure is founded on a very simple concept called the "set," which consists of "owner" records and "member" records. The set can be viewed as a simple two-level tree structure, with the owner record at the root and the member records at the branches.

Because there are no restrictions on how many sets a record can belong to, the user can define a large number of simple sets so that the data base, when viewed as a whole, can be seen to consist of complex trees, networks, chains, rings or any other structure desired. The application programmer, on the other hand, sees only those simple sets of concern to him. The Subschema Data Description Language permits description of data as the programmer needs it, not necessarily as it exists in the data base.

A programmer who prefers his data in packed decimal form will get it that way, while another programmer who wants the same piece of data in binary form will get it in binary.

The PLC accepted that architecture and immediately began to develop the detailed specifications for the Cobol Subschema Data Description Language and the Cobol Data Manipulation Language. However, the detailed specifications of the Data Description Language were felt to be outside the purview of PLC, so the Codasyl Executive Committee formed a new committee, the Data Description Language Committee (DDLC); and charged the DDLC with the responsibility of developing and maintaining the Data Description Language, similar to the way its PLC sister committee was developing and maintaining Cobol. The development of extensions to other programming languages, such as Fortran, has also begun.

### Subsets Produced

The vendors immediately began to work on implementations of the Codasyl specifications, even though they had not yet been approved officially by Codasyl. No vendor has yet implemented the full languages, but some very useful subsets have appeared.

Today's data management systems that are based on some version of the Codasyl specifications are DMS-1100 from Univac, DMS/90 from Univac, IDMS from Cullinane Corp. (runs on IBM 360), DMBS-10 from Digital Equipment Corp., DM-6700 from Burroughs and DMS Extended from Xerox.

Codasyl has recently officially approved the specifications of the Data Description Language from the DDLC. The specifications (entitled DDL Journal of Development) have been published by the U.S. Government Printing Office, and are available as the National Bureau of Standards Handbook 113, for $1.70. The specifications for the two Cobol-oriented languages have been published for public information, but have not yet been officially approved by Codasyl.

These proposed specifications are also available from: The Technical Services Branch, Department of Supply and Services, 5th Floor, 88 Metcalfe St., Ottawa, Ont., Canada K1A OS5. Remittances should be sent with the order and $2.50 per copy, and made payable to "The Receiver General of Canada." Nearly 1,000 copies of this document have already been sold.

Readers wishing to contact Codasyl directly about their work should write to Codasyl, Post Office Box 124, Monroeville, Pa. 15146.

*Mike O'Connell is a principal of the Paladin Group, consultants in the data base area, and is vice-chairman of Codasyl's Programming Language Committee.*

# Dictionary Links Data to Uses

By Harold Uhrbach
Special to Computerworld

**The development of an effective data base-oriented environment and its ultimate success may well depend upon the effort initially devoted to the collection of data and its classification relative to frequency of occurrence (redundancy), naming conventions (synonyms), characteristics (format-meaning), relationships (data sets, records, aggregates) and the usage of data by application.**

**In this regard, a number of data dictionary software systems have been recently developed which provide an automated method of organizing and presenting information relative to the data in the data base, and in an extended view, the company as a whole. Data dictionary systems will generally perform functions in two basic, related areas: dictionary and directory.**

**The dictionary, as the repository of information about data, is a most useful tool for initially documenting the data which comprises current files and/or reports, and in relating that data to current applications.**

**Ultimately, the dictionary will perform similar functions for the data base itself. The specific functions of the dictionary are:**

- **Provide a glossary of terms for use in referencing data items and/or records via user inquiry or system. The**

*(Continued on Page S/14)*

Recurring Computer Nightmare #5

# The day Computer-Date found love everlasting for Sue Anderson.

Blame it on a whimsical programmer, or a brown-out at Con Edison. The fact remains that computer errors, whatever their source, are incompatible with smooth performance.

What you need is a way to cut your possibility of error down to an absolute minimum. And the best time to start is when you place your next order for computer tape. Just specify BASF.

At BASF, we make the extra effort to provide you with tape as near perfect as possible. Case in point: our exclusive double-cut slitting technique eliminates edge waviness, an elusive cause of writing and reading errors. Keeping the edge straight helps you keep your data straight.

One more edge. Our tapes don't cost any more than the competition's. You're already paying for BASF quality . . . you might as well have it. Write today for the whole story of how BASF tapes stack up against the competition. Remember, nobody makes better tape than the people who invented it. BASF Systems, Crosby Drive, Bedford, Mass. 01730


# When it's BASF...you know it's


**not the tape that goofed.**

# Dictionary/Directory Vital to Classify Data Characteristics, Relationships

*(Continued from Page S/11)*

glossary contains merely the data item/record title, and a brief description of the data.

- Provide a data item/record description which indicates the characteristics and attributes of each unit of data. The dictionary would then be able to analyze these data descriptions and to identify inconsistencies.
- Provide a vehicle for identification of multiple occurrences of data items (redundancy), either by a set of common characteristics or by common designation. Elimination of the redundant data items, however, must be based upon analysis of usage in various applications.

Recognition of redundant data may be an early indication that a common data base might be justified, ideally with each data item existing only once in the data base.

Similarly, reports which contain common data items would be identified as possible candidates for elimination or combination, without affecting the overall information received by users. Further analysis, of course, may indicate the data itself has no real information value to the users, and justify elimination from that viewpoint alone.

- Define the relationships of data items to records (contents) and of records to other records (data structure), as a basis of information which analysts would reference in determining the appropriate path of storage/retrieval of data.
- Provide a cross-reference relating users/applications to one or more data items, and conversely relating data items to one or more users/applications. This reference is particularly useful in controlling the effects of changing data characteristics on multiple application programs that refer to the same data item.
- Provide both an internal representation to the system and external documentation of user authority and functional rights relative to data items/records in order that the integrity of the data base (and other data) might be maintained.
- Provide a vehicle for defining and controlling a set of validation criteria to be applied once to each data item at the time it first enters the system.

### Directory's Function

The directory should be considered as an extension of the dictionary and its above defined functions in the sense that two most significant data base-oriented functions are provided:

- Provide a vehicle for recording the physical location of data to aid the data base designer in determining effective storage strategies, and to enable an analyst to determine the availability of data.
- Support the data base management system (DBMS) by providing a single path of data definition and input. In this view of the directory, the data administrator would define the data, its characteristics and its relationship to other data directly to the dictionary/directory, which would then build and maintain internal tables and indexes. The directory would then generate an appropriate data definition (DDL) for the DBMS.

In this context, all data input would likewise be funneled through the dictionary/directory, with security and validation performed against the predefined data description.

The merits of a single path for data definition and data entry are clear. Consistency and compatibility of data are enhanced, and a more efficient use of resources (staff, core, etc.) results.

There are other aspects of the directory, however, which are less desirable. At the present time, every DBMS maintains its own internal tables and indexes which represent the data base structure and indicate the basic characteristics (format) and the physical location (where it is appropriate) of the data.

In addition, some of the functions – particularly security and validation – of the dictionary/directory will logically reside in either a transaction controller or the DBMS. In these instances, therefore, the dictionary/directory will contain information which is redundant to that of the DBMS.

A further source of redundancy is in the data description (DDL) itself. Those systems which do not generate the DDL for the DBMS will, in effect, require a dual data description – one each for the dictionary/directory and the DBMS.

One of several feasible alternatives will offer an effective long-term solution to these problems:

- The internal directory can be enhanced to include the information and processing functions of the dictionary/directory. A drawback in this approach is that the internal DBMS directory would be limited to control of the data in the data base, and not readily extended to encompass data which is external to the data base.
- The internal directory can be removed from the DBMS, and the system modified in the future to interface directly with the dictionary/directory system. In this view, a DDL would not be required for the DBMS. This approach would permit inclusion of all data of the organization.

At the present time, a number of dictionary/directory systems are being marketed, each with some set of unique attributes and features. These systems are:

- Arthur Andersen – Lexicon
- Eastern Air Lines – Data Base Directory
- IBM – Data Dictionary/Directory System (DD/DS)
- Logica, Inc. – Logic Metadata System (LMS)
- Software Unlimited – Command
- Synergetics – Data Catalogue
- University Computing – UCC-TEN

These systems are all capable of handling the basic dictionary functions, though some offer greater flexibility in the definition of information maintained and in the specification of reporting requirements.

On the other hand, however, only Eastern Airlines, based on Total, and University Computing (IMS) offer the directory function of automatic generation of the DDL.

In summary, the dictionary/directory systems offered are most useful and a necessary and desirable element of any data base processing environment.

*Harold Uhrbach is president of DBD Systems, Inc., Oceanside, N.Y., and lecturer on data bases for the Institute for Advanced Technology.*

## User Switches to DBMS—the Decision

# Year-and-a-Half Evaluation Effort Pays Off Later

By Don Leavitt
Of the CW Staff

CHARLOTTE, N.C. – An evaluation of data communications/data base management systems may take a year and a half, but the effort pays off at final decision time even if the "winner" of the evaluation is replaced by a runner-up, according to Gerry Woltman, who managed such an evaluation and much of the implementation after a system was picked at First Computer Services (FCS).

A need to have three major applications operating on-line in a limited time frame made IBM's IMS the system of choice rather than PMI's Intercomm, which appeared to have the best price/performance potential of all the systems studied.

FCS handles the DP work for subsidiaries of Cameron Financial Corp., including First Union National Bank with 200 branches across North Carolina, and Cameron Brown, mortgage bankers in eight states.

Two-and-a-half years ago, FCS had implemented an on-line audio response system for various banking services and another on-line system for the bank's Master Charge franchise. Installed on a 360/50 – replaced shortly by a 370/155 – they were based on the Minerva (Minerva Inc.) telecommunications monitor.

"Like many TP systems, this one cost a lot more and took a lot longer than FCS anticipated," said Woltman, who joined the company about then to see if the situation could be improved.

He became convinced that the list-processing approach of Minerva was inappropriate for the bank's applications. FCS programmers needed a system that would use their Cobol experience, he explained, rather than requiring "strange, funny-bunny-type lists."

Woltman started checking FCS's real TP needs and expectations. Though the demands then were low, he saw no need to settle for a small control program: FCS has enough hardware and financing to use whatever system would do the job best in the long run.

Banking is a volatile business and the system should allow very fast responses to inquiries by non-DP types. FCS could benefit most, Woltman reasoned, with a people-oriented system that was able to handle control problems by itself, without operator intervention.

*(Continued on Page S/16)*

# Year-and-a-Half Evaluation Effort Pays Off Later

*(Continued from Page S/15)*

Specifically, the sytem should have high-level language (Cobol) support, file access methods compatible with the high-level language, and good restart/recovery and transaction journaling for disaster backup.

A small ad sought information about an available DBMS, an on-line executive or a report writer – and especially any system that had any two of these facilities. The ad drew about 200 replies including an offer from Goodrich for the system it was then developing in-house (now IDMS) if FCS could maintain it.

### Definitions Refined

Woltman didn't have staff enough to get involved in any maintenance and many of the other replies didn't meet FCS's needs. But screening that first flood of suggestions helped him refine his working definition of a responsible supplier.

IMS was an "obvious" system to evaluate, he said, though the release then available looked "incredibly bad." FCS needed a good TP monitor and wasn't really interested in DBMS except in an academic way. Woltman's crew began looking at Intercomm (from PMI), Environ/I (Cincom), and "a very long list" of other possibilities including CICS.

Studies at that time were extremely detailed involving, for example, 100 hours of on-site conferences at Results, Inc. in considering RDMS – and the whole session was videotaped for later review!

Once FCS had made this first pass at evaluation, it went to the consulting firm of Booz, Allen & Hamilton to get professional, outside advice "even if – especially if – it ran counter to our own thinking," Woltman said.

That led to a tighter definition of the potential vendor and an awareness that the target system, if a TP monitor alone, must at least have an interface with a DBMS since that now appeared more clearly to be the path of future growth.

This brought the list down to about 10 potential systems. Woltman laid out a matrix of requirements and the candidates and saw, for example, that Hyper-Faster (Comress, Inc.) didn't have good enough Cobol support and CICS had no linkage to a DBMS.

So the list dropped to four systems that qualified for what Woltman called "discreet level evaluation."

The staff developed 50 questions to ask about each, to portray the way they as technicians thought the system ought to work, to provide integrity and to provide room for growth. "Now we were asking, 'Is it a queued system or not?', 'If not queues, how does it handle transactions?', and 'Will it support audio response units?'," Woltman explained.

Using a weighted system of scoring to reflect the agreed importance of each item to FCS's operations, the evaluators rated IMS II as tops, followed by Intercomm.

Finally, Woltman considered the cost of implementing these two systems. Features found lacking in the evaluations were tagged as required or desirable and estimates were sought from various sources to determine what it would cost to bring each fully up to FCS specs.

Changes in IMS were largely enhancements, whereas modifications in Intercomm involved some "pretty hairy stuff" deep in the system logic. Nonetheless, the staff concluded that with enough time Intercomm would provide the best price/performance.

### The Bomb Drops

In February 1973, Woltman recommended that FCS acquire Intercomm. But then his management dropped a bombshell: they had to have three major applications operational by March 1974!

Even if the Intercomm changes were completed on schedule, FCS would be badly pressed for time. And the changes were so basic to the system, it would be unstable and, Woltman realized, FCS would have to live with that situation for six to eight months.

Management said that would be unacceptable. The required applications involved other organizations and they had to work.

That being the case, Woltman reversed his recommendation and said FCS should commit itself to IMS "with all its implications." To get to the environment management wanted, they had to "buy into the data base thing too" even if earlier thinking was to follow a more gradual move in that direction.

"We can do it. We know how to move to IMS. But with the specialized files, there's no way of getting out of IMS for a long, long time, without staggering losses," he went on.

Management looked over the work Woltman had managed up till then, looked at the applications that had to be done and in March 1973, okayed FCS's move into the world of IMS.

## User Switches to DBMS —the Implementation

# Pert Charts Used in Decision Phase Ease Installation

CHARLOTTE, N.C. – Careful work done during an evaluation of data communications/data base management systems pays off handsomely during implementation of the chosen system.

As part of the year-and-a-half-long evaluation effort for First Computer Services (FCS), Gerry Woltman and his crew developed Pert charts showing specific work steps needed to get IBM's IMS or PMI's Intercomm installed. Though they advocated Intercomm, a decision to go with IMS meant only that they'd follow a different part of the chart.

The charts showed the date, estimated cost and time needed to get each change made, and showed the changes by name so there was no mistake as to what each activity on the chart was. FCS was able to load the whole project into its job scheduling system.

Woltman became manager of a Systems Administration Group (SAG) and put together the organization plan developed during evaluation. One of the evaluators became telecommunications administrator; a member of the project management team was named data administrator; and Woltman went out and recruited a data base administrator – a post he considered vital to the use of IMS.

### Early Legwork

The actual implementation effort started just about a year ago. The four-man SAG and the administrators did most of the early legwork themselves. This included such things as planning how or where they could get a batch terminal simulator, and working out a formatting language to get to and from the 3270 CRT terminals.

The FCS system programmers began to phase into the project about four months ago "and just about then things began popping for us," Woltman noted.

IBM announced an Installed User Program for Batch Terminal Simulation. "That's not exactly the way we would have done it," Woltman thought, "but it'll do fine. Let's get it."

IBM announced 3270 support: "Groovy, that's not the way we'd have done it either, but that's exactly what we're after; we'll take it," he said.

FCS already was using Applied Data Research's Metacobol as a precompiler so SAG put into tables all the codes the applications would need to work with the various devices in the system and turned these into Metacobol macros. Applications programmers could use these without being concerned about the detailed logic behind them.

These macros represented about 1,000 lines of Cobol coding and made all the associations to data bases, control blocks and masks the programmers had to have, leaving them with nothing but the application level Procedure Division coding to write.

### Demands From St. Louis

There were some major problems even with projects like the Master Charge support that FCS had already developed once. There had to be a link to a national authorization center in St. Louis, and the System/7 there treated all CPUs linked to it as if they were terminals under its control. IMS normally wants to be the control system, so FCS had to develop a special module to modify IMS line control to handle the demands from St. Louis.

FCS brought in outside consultants and has completed the module. In fact, application programmers are now running program unit tests in and out of St. Louis and the problem of the conflicting demands of the control systems appears to be licked.

All of the audio response transaction processing has been written in Cobol, the data bases have been developed and the operation is in system test now, Woltman noted, and is scheduled to enter production mode April 1.

The changeover to IMS of the commercial loan system, originally acquired from Centurex, has been nearly completed and that application is also scheduled to phase into production mode in April.

If everything goes well, once those three applications go live, Woltman said, "we'll throw Minerva away."

He added that FCS hadn't hit any major snafus in either programming or hardware installation. But they have had a lot of minor aggravations, like being sent the wrong equipment.

Woltman said things look good right now. But the out-of-pocket expenses for installing IMS and doing it well have been slightly over $100,000.

He estimated, for example, that more than 1,000 man/days were spent on the evaluation phase. The four-man SAG spent 45% of the past year on either "hard" implementation or consulting with programming groups. The three administrators have put all their time on the project, and two of the FCS system programmers have been allocated to it for the past six months.

Training of all concerned, from programmers through operators out in the field, has been handled by Woltman's group and has focused rather heavily on video-taped sessions showing how and why things have to be done certain ways. This preparation has also added its costs to the conversion, he said, but should pay off as the systems go live.

Within the mainframe, 500K bytes are devoted to IMS, with two on-line programs running concurrently. This still leaves a megabyte of memory for regular production work, Woltman noted.

# DBMS Can Fulfill Promise Made By Computers a Decade Ago...

By Thomas Meurer
Special to Computerworld

The continuing development of centralized data base management systems (DBMS) provides users of data processing with an array of flexible, powerful, general-purpose software products that can benefit many of their applications areas. These systems do not represent the panacea for all computer or corporate ills, but they do provide us with a potentially valuable tool.

While there are, in fact, a number of specific areas where DBMS can be valuable, we will focus here on some of those that have a general importance.

The separate "file-based" manner of designing computer systems has inherent limitations when it comes to relating data from several applications. This can and certainly has been accomplished, but the specific mechanics of sorting, creating external indices, or maintaining internal indices to relate say, the payroll file to the production control file, are cumbersome.

To employ these same techniques on a wider scale to relate many data files in many logical connections was impractical until DBMS became available. Their facilities for logically linking up data and properly maintaining the necessary connections provide a means for establishing new areas for corporate verification and cross-reference.

### Produces Consistency

The capacity of DBMS to store pertinent information once and only once creates a level of reliability that is unachievable under the techniques of file management. For example, a customer's address need only appear once in the data base. All processing can make use of the centrally accessible reference, producing consistency among any applications that may require it.

When that address changes, too, the job of notifying all systems concerned is reduced to updating a single occurrence of the data. No longer must the intended new address pass from application to application by some mysterious process understood only by a systems analyst who has long since left the company.

As data is increasingly less applications system dependent and more wide-ranging in its relatability, it is substantially more useful to its owners. As the relationships between elements of computer-stored information come closer to the actual relationships that logically do or should exist between these elements, the data becomes meaningful from multiple "angles" or retrieval paths. DBMS permits us to define these "real-world" relationships into our storage networks with startling results: reports that reflect meaningful conditions in the organization.

What has been needed is another level of computer modularity, where existing systems and programs can be functionally independent from the data itself. Thus, when new data entities are added in response to any of various needs, all computer systems might not have to suffer an architectural thrombosis.

The data base management packages are enabling the definition of data to be separated and insulated from the applications programs which may need to have access to it. This so-called data "independence" is still in its infancy, but very real advancements have already been experienced by present DBMS users. As time goes on, DBMS will allow increasing sophistications in this area of concern.

### Great Promises

Ten and 15 years ago, proponents of the computer pointed confidently to their new technology and drew pictures of greater corporate "control." The computer would give us the tools, they said, to regulate and standardize applications across division lines, even across subsidiary company lines as conglomerates became increasingly prevalent. At last management would have the information it needed to make wise corporate decisions.

In spite of the substantial progress that we have witnessed – both in hardware and software capabilities – this promise of the computer has remained largely unfulfilled. Each application system continues to be developed and implemented in its unique fashion, and while Cobol has many installations "speaking" the same computer language, the DP centers themselves remain separate and inconsistent.

DBMS provides a new level of control, a kind of extensive power over disparate applications that can prove highly effective in the hands of the right data base administrator. Unified control over the wide range of applications data architecture, the power to enforce standard data nomenclature and data relationships, and the resulting ability to relate the data from one area of a corporation or institution to another are only some of the capabilities that have begun to materialize with DBMS.

It will be through unified intelligent implementation of comprehensive DBMS that the computer will bring to pass during the next six years the kinds of corporate benefits that were promised for it a decade or more ago.

*Thomas Meurer is vice-president of the Cullinane Corp. and was formerly data base administrator at General Tire and Rubber Co. He also conducts the seminar on data base design for the American Management Association.*

# ...But for the Unwary, DBMS Can Bring Unbridled Disaster

By Margaret A. Herrick
Special to Computerworld

Not all businesses and applications need a data base. The fact is, while a data base can be a tool of unprecedented value, it can also be the cause of a disaster of proportions unusual even in the disaster-prone data processing field.

To begin, if the answers to the following questions are yes, then using a data base is asking for trouble and unnecessary cost.

- Is solving one applications problem at a time adequate?
- Are the needs of various departments divorced from each other?
- Do duplicate sets of data serve a purpose and not cause problems?
- Is immediate timeliness of data of secondary importance?
- Is the cost of a data base beyond its business value?
- Is the cost of an initial study of needs prohibitive?
- Is one access method per file all that is really needed?

There are basically four major problem areas in the use of data bases:

1. In common use, the term "data base" is ill-defined, leading to confusion and inappropriate attempts to use data bases. Actually, technicians have developed data base criteria which are fairly specific: relationships among records are known; data elements are not redundant; all users use the same data; most business data is included; information is not stored but generated by processing; data elements are accessed by multiaccess techniques; processing approach is variable; data structure is independent of programs; system provides security for data at all levels (elements through total data base) and provides data backup.

2. Inexperience with a very complex field leads to a multitude of major errors. Very few people have the background, experience and knowledge to create and use a data base with skill. Inexperience and half-knowledge is so widespread that most projects are doomed from birth.

**'I Imagine It'll Be Wonderful When It's Finally Operable — If We Survive the Construction Phase'**

Data base software is complicated and needs sophisticated skills to use and maintain it. Non-standard or in-house written software is to be strongly discouraged.

Often ignored because of inexperience, three areas of growth should be considered in planning a data base: physical (size of data base, records and data items), logical (new records and relationships) and procedural changes. Often the entire project is incompletely evaluated before it is started.

One of the most drastic results of inexperience is an unwillingness to modify the first data base design (which will be and should be idealistic) for practical considerations. Trade-offs are extremely important and must be evaluated.

3. The fashionable nature of "using a data base" leads to the start of many projects when the need is inadequate. One type of personality attracted to DP tends to approach each innovation, new software package and piece of hardware as a fascinating toy with properties and limits to be explored and tested. But a data base by its nature is a very expensive toy and a tendency to use it because of its appeal is a tendency towards disaster.

4. A data base project is large and complex by nature, which can mean major cost outlays, inadequate project control and lack of overview understanding.

Initial studies can and should be extensive and can be very expensive; in fact, the cost and extent of the study may commit the business to proceeding with the project.

The data base and its major support programs should be completely designed before implementation begins, but the implementation should be in very small modules. The rule is to start small and not do everything at once.

The lengthy time from start to finish can cause innumerable setbacks, including changes in personnel, changes in management philosophy, management impatience and a lack of continuity of purpose. Business must continue while the project is being designed and implemented, thus at most times two systems and methods must be supported with money and people.

*Margaret Herrick has been a consultant and lecturer on data base design and implementation with Honeywell Information Systems.*

## *Tailored Cobol Instead?*

# Generalized DBMS Not for All

**By Paul Oliver**
Special to Computerworld

Generalized data base management systems (DBMS) are developed under a variety of names – data management systems, information management systems, information retrieval systems, file management systems and query systems are among the more common terms. Unfortunately, these terms do little to indicate the capabilities of a system or the application for which it is designed.

Thus, under the umbrella of these generic names, one finds a broad spectrum of systems ranging from those with elementary record structures, inflexible file organizations and rudimentary or nonexistent report generation capabilities, to elaborate systems with complex record structures embodying hierarchical and associative relationships, generalized file organizations and on-line retrieval capabilities. This obviously makes the evaluation, selection and use of data management systems software very difficult.

What do we mean by a "generalized" system? There may be some disagreement over details, but such a DBMS must surely support a variety of data representations and a broad spectrum of operational capabilities.

These should include data base creation, modification and reorganization; direct, sequential and mixed access methods; file processing capabilities including the definition of processes and files, invocation of these processes, definition of temporary files, and specification and invocation of reports; and some form of file partitioning for on-line retrieval based on logical combinations of keys and qualifiers. The latter capability implies the additional requirements of directory management, and key transformation and directory overflow handling.

### Need 'Depends'

A generalized DBMS is an intricate piece of software. It is probably second only to operating systems in its development cost and effort, complexity, overhead requirements and maintenance problems. Thus, a natural and proper question to ask is, "Do I really need one?" The answer, of course, is, "It depends."

The usual argument in favor of a generalized system runs something like this. Most modern institutions using data processing equipment are complex in structure and diversified in their functions. This is equally true of business organizations, government agencies, universities or research laboratories. Thus, DBMS must be able to handle the diverse data and functional requirements existing within any given organization.

Furthermore, a vendor-supplied generalized system will be more maintainable and better supported than a specialized, homegrown product.

Finally, a generalized system will be better able to handle the changes in data management requirements accompanying the inevitable changes in the nature of the customer institution.

### Going It Alone

While this argument is appealing, so is its counterpart. Specifically, one must consider the advantages of a do-it-yourself, tailored system, based on a higher-level language. A tailored system will, assuming some competence in its designers, be considerably more efficient. This efficiency can be gained at little loss in flexibility.

A system based, for example, on the revised Cobol language (1974 Standard?) could easily support complex data structures such as multilists, inverted files or rings, as well as the common sequential, direct and mixed access methods. The capabilities required to do this are well within the scope of the revised language.

Such a system will surely be more portable than a generalized one, which is likely to be married to a given operating system or query language. Operational costs are likely to be lower and a tailored system should be more reliable. Better supportability and maintainability are claimed for generalized systems, but there exists little quantitative evidence to support this claim.

One must beware, of course, of thinking that any data management system is easy to develop – none are. Furthermore, even the use of a standard language such as Cobol has its pitfalls, due mostly to the fact that while the language specifications are indeed standardized, the various compilers' interpretations of these specifications are not. In testing Cobol compilers for conformance to the standard, we have found that many of the problem areas encountered can have a serious effect on the integrity of the data base.

Thus, it must be emphasized that while there are potential advantages to both generalized and tailored systems, these advantages are meaningless unless they are realized.

*Paul Oliver is director of the Software Development Division of the U.S. Navy's ADP Equipment Selection Office.*

## From Basic to Advanced

## From Design to Implementation

# Formal Courses Offered to Preface On-Site Training

By George Schussel
Special to Computerworld

One of the biggest problems facing DP users today is how to train personnel in all the aspects of data bases. This runs the gamut from design considerations to actual programming and implementation.

Surely, the best way to get a data base education is to get yourself assigned to a data base project. However, even if you're fortunate enough to get this assignment, it's a good idea to try to preface on-the-job training with some formalized education. This should include some formal courses as well as reading some of the recently published literature on data bases.

### Seminars by Independents

The best place to get started is to take one or more introductory courses offered by an independent seminar firm. Those listed below offer public courses in various cities throughout the continental U.S. on a monthly basis. If you're willing to wait two or three months, it's probable that one of these courses will be offered in a city close to you.

The tuition charges of the seminar firms usually include luncheons and the seminar itself and generally run in the range of $125 per day per person.

Probably the most widely attended seminar is New York-based AMR International's "Data Base Design." Over 3,000 professionals have attended this course in the last 2-1/2 years, and AMR reports that of all their courses, "Data Base Design" is one of the most successful in both number of attendees and course ratings.

This three-day course is offered in most major cities and covers topics ranging from basic to advanced as well as competitive DBMS packages. "Data Base Design" covers both technically oriented topics and the management implications of data bases.

Control Data Corp.'s Institute for Advanced Technology (IAT), Washington, D.C., has taken a different approach toward the same subject. Instead of one introductory course touching on all the different areas of data bases, IAT offers several courses, each one tailored to a particular area of interest, such as comparisons of packages and job of the data base administrator. IAT's courses are offered monthly in various cities around the U.S.

The American Management Association, New York, has offered a course in the past on data bases that has attracted, by association estimates, some 500 attendees in three years. The subject matter is a tough one, AMA said, but "uneven quality" in the past will be overcome in a revised course planned for later this year under a single course leader. You may want to check with the AMA as far as their new products are concerned.

Performance Development Corp., 32 Scotch Road, Trenton, N.J., has just come out with a series of courses entitled, "Data Base 1974."

PDC is offering three one-day seminars: The Data Base Commitment; Data Base Package Evaluation and Selection; and The Role of The Data Base Administrator. In addition, PDC has one five-day seminar on IMS Design and Implementation Inefficiencies.

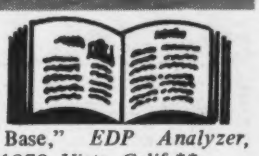
Q.E.D. Information Sciences, Inc., 170 Worcester St., Wellesley Hills, Mass., offers courses in three areas: Management Overview, Data Base Design and Data Base System Evaluation. These courses are structured around the highly successful publication, "Data Base Management Systems: A Critical and Comparative Analysis." Instead of public courses, Q.E.D. primarily contracts for in-house courses.

All vendors of data base management systems offer data base-oriented courses. Of course, these are biased toward their own particular systems. Companies such as Univac, with DMS 1100; Burroughs, with DMS 6700; Cincom, with TOTAL, etc., offer both introductory and advanced courses on their individualized systems. Since most of these course offerings change rather frequently over time, I suggest that you directly contact the vendor if you're interested.

The two hardware vendors with by far the greatest number

*(Continued on Page S/22)*

# If Data Base Systems Entice You, Read On



This bibliography, compiled by George Schussel, should hold any user in good stead for getting into an actual implementation of a data base management system (DBMS). Schussel rates the publications: Best – ***, Good – **, Fairly Good – *.

1. *An Introduction to Data Base Design,* John K. Lyon, Wiley-Interscience, New York, 81 pages, $7.95.*

General introduction to data base management for programmer types.

2. *Data Base,* ACM, 1133 Avenue of the Americas, New York, N.Y.*

This quarterly newsletter of the special interest group on data processing is primarily concerned with data base and data management systems.

3. "File Structures and Operations," Richard L. Szatkowski, *Data Management,* September 1973.**

A good discussion of basic access methods and file organizations.

4. "The Characterization of Data Management Systems," George S. Pan, *Data Management,* June 1971.*

This article is a very short general-purpose treatise on DBMS. Definitions, structures, file organizations and overhead structures are covered in six pages.

5. "Data Base of the '70s," John McCarthy Jr., *Data Management,* September 1970.**

This is an excellent, short, theoretical view of data base, its definition and its approach to solving some of the significant problems in the data processing sphere.

6. "Comparison of Data Base Management Systems Reports," Guide International Corp., October 1971.*

A position paper representing Share/Guide opinions on a proposed DBMS and IBM's response to those opinions objecting to the structure of the proposed Data Manipulation Language.

7. "Creating the Corporate Data Base," *EDP Analyzer,* February 1970, Vista, Calif.**

8. "Organizing the Corporate Data Base," *EDP Analyzer,* March 1970, Vista, Calif.**

9. "Processing the Corporate Data Base," *EDP Analyzer,* April 1970, Vista, Calif.**

10. "Data Security in the Corporate Data Base," *EDP Analyzer,* May 1970, Vista, Calif.**

The first of these is an overview and the introductory report on the concept of a common data base. Problems and promises are discussed. The March issue addresses the problem of file organization and data relationships. The April issue discusses data management systems, giving specific examples of

*(Continued on Page S/23)*



# Get an Education Before Project Begins

*(Continued from Page S/21)*

of data base users are IBM with IMS and Honeywell with IDS, (which has been around much longer than any other established data base system).

Honeywell's courses generally run for five days and are "bundled" (i.e., no tuition charge). Their three basic courses are: "An Introductory IDS Overview," "IDS System Design" and "IDS Programming."

IBM offers IMS courses. Several two and three-day courses are offered on IMS Batch that add up to a total of 15 days of training. The total tuition for all of these courses is $2,000. In addition, IBM currently offers another 12 days of training on IMS data communications for which the tuition is slightly over $1,500.

Most IMS users will find that at least their initial cadre of analysts/programmers will want to attend the majority of these IBM schools or a functional equivalent from the independent vendors.

A final caveat on courses and seminars: With the exception of the AMR and CDC/IAT offerings, these seminars have a tendency toward rapid content change. You should check with the course vendor and ask for references before committing your time and money.

*George Schussel is vice-president of American Mutual Liability Insurance Co., Wakefield, Mass., course director of the Advanced Management Research (AMR) seminar on data base management systems and author of numerous articles on the same subject.*

# There Are Plenty of Articles for the Interested User

*(Continued from Page S/22)*
several brand items. The May issue is addressed to the less exciting but very important problem of data security in the situation when sensitive data resides in on-line files. Many good references are listed.

11. "The Debate on Data Base Management," *EDP Analyzer,* March 1972.***

Must reading for anyone who wants to understand the various positions of Guide, Codasyl and the various hardware manufacturers on standards for DBMS.

12. "The Data Administrator Function," *EDP Analyzer,* November 1972.**

Another worthwhile article in this newsletter on a subject of interest to data base implementors.

13. "File Management Systems: A Current Summary," Carolyn Byrnes and Donald Steig, *Datamation,* November 1969.**

Although several years old and therefore somewhat outdated, this article gives a good summary overview of the file management systems generally available in 1969.

14. "An Approach to Data Base Design," Thomas Galley, *Journal of Systems Management,* February 1969.**

A short, well-reasoned article describing data base and data management. Objectives, requirements and approaches are discussed and effectively summarized.

15. *Data Base Management Systems: A Critical and Comparative Analysis,* May 1973, $385 from Q.E.D. Information Sciences, 170 Worcester St., Wellesley, Mass. 02181.***

This 340-page book is truly the magnum opus of data base. Starting with an introductory overview, the book gets into a detailed comprehensive discussion of features such as data manipulation, query languages, file structures, communications and DBMS installations. From these general discussions, the text proceeds into a comparative analysis of four IBM-oriented DBMS: IMS, TOTAL, SYSTEM 2000 and Adabas.

16. "Data Base: A New Standard for Insurance EDP," George Schussel, *Best's Review,* October 1972.**

17. "Business EDP Moves to Data Bases," George Schussel, *Business Horizons,* December 1972.***

These two somewhat similar articles provide a good introductory overview of the data base concept.

18. The Data Base Administrator," Guide International, November 1972.*** (Guide publications are not available for sale, contact a Guide member – most large IBM users – or contact an IBM sales office.)

This 70-page report is easily the most outstanding and comprehensive analysis of the duties of a data base administrator.

19. "Basic Requirements for a Data Base Management System," Guide International, February 1973.***

Eminently readable technical primer describing the minimum functions of a DBMS.

20. "Data Base Task Group Report to the Codasyl Programming Language Committee," April 1971. Available from ACM, 1133 Avenue of the Americas, New York, N.Y. 10026. $6.**

Must reading for the serious data base implementor – this 269-page report should be skipped by those who are just interested in general familiarity with the subject or management overview. An approach is presented for general data base capabilities to interface with a number of host languages. The general proposal contains provisions for a data description language and a data manipulation language.

21. "The Cautious Path to a Data Base," *EDP Analyzer,* June 1973**

A 12-page article devoted to potential pitfalls and problems in setting up and installing a data base. Some user experiences are summarized.

22. "Computer Data Bases: The Future is Now," *Harvard Business Review,* September 1973.*

Introductory article using a mini-case to present the concept of data bases.

23. "Some Systems Shouldn't Use Chained File Techniques," William Charles, *Data Management,* Sept. 1973.***

This article is particularly good – it discusses some of the overheads involved in various methods of accessing data off DASD devices instead of sequentially oriented tapes. Various addressing schemes are defined and compared with sequential access as far as overhead, efficiency and type of system to be implemented on each.

24. "Key Evaluation and Planning Factors for a Data Base Environment – A Case Study," Kenneth Finn, *Data Management,* September 73.*

A case study summary of McDonnell Douglas's approach to the building of a manufacturing control system on a data base.

25. "Data Structures and Accessing in Data Base Systems," Senko, et al, *IBM Systems Journal,* Vol. 12, No. 1, 1973.**

26. "Data Dictionary/Directories," Uhrowczik, *IBM Systems Journal,* Vol. 12, No. 4, 1973.**

Both of these articles are rigorously written, tightly thought-out articles, oriented toward the theoretician or DBMS designer. Both articles give extensive definitions of basic concepts.

# Get the news when it happens.

# Not when it happens to get to you.

## order your own subscription

Please send me COMPUTERWORLD for 1 year.

☐ U.S. – $12 ☐ Charge My American Express Account:

☐ Canada – $13 ☐ Other foreign – $36

☐ Payment enclosed ☐ Bill me

If charge, we must have cardholder's signature:

| | | | | | |
|---|---|---|---|---|---|
| First Initial | | Middle Initial | | Surname | |
| Your Title | | | | | February 27, 1974 |
| Company Name | | | | | |
| Send to: Address | | | | | |
| City | | | State | | Zip Code |

Address shown is: ☐ Business ☐ Home

☐ Check here if you do not wish to receive promotional mail from Computerworld.

COMPUTERWORLD • Circulation Department • 797 Washington Street • Newton, Mass. 02160

**PLEASE CIRCLE 1 NUMBER IN EACH CATEGORY**

**YOUR INDUSTRY**

01 Mining/Construction/Oil & Refining
02 Manufacturing – Computer or data system hardware/peripherals/other associated mechanical devices
03 Manufacturing (other)
04 Utilities/Communications Systems/Transportation
05 Wholesale/Retail
06 Finance/Insurance/Real Estate
07 DP Service Bureaus/Software/Planning
08 Business Services (except DP)
09 Education/Medical/Legal
10 Federal, State and Local Government
12 Communications/Printing/Publishing
13 Other:

**YOUR FUNCTION**

01 Corporate Officer
02 Data Processing & Operational Management
03 Data Processing Professional Staff
04 Consultant
05 Lawyer/Accountant
06 Engineering-Management/Scientific/R&D
07 Sales/Marketing/Account Executive
08 Librarian/Educator/Student
09 Other: _____

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

# Canadians Take Steps For National Federation

Special to Computerworld

OTTAWA, Ont. – Some tentative first steps are being taken here to unite the diverse DP groups into a Canadian Federation of Information Processing Societies, much like Afips in the U.S.

**Societies/ User Groups**

A proposal to form such a federation is currently being circulated among executives of Canadian DP associations.

If it should find affirmative response, the announcement of the formation of a federation could be made by the middle of this year.

Proposed participation includes the Canadian Association of Information Sciences, the Computer Science Association, Data Processing Management Association, Cors, DPI and the Canadian Information Processing Society (CIPS).

The boards of directors of the various associations representing the information industry are being asked to discuss the feasibility of the proposal.

Advantages are seen in having a united front for the information industry when dealing with governments and in the presentation of views on public issues. Better national education programs are also seen as benefits.

# NCC'74 to Review Privacy

CHICAGO – More than half the total conference program of 119 sessions at the National Computer Conference will be devoted to an analysis of major applications and management techniques in key user areas. These 63 sessions will cover such areas as health care, education, manufacturing, transportation and government. NCC 74 takes place May 6-10 at McCormick Place here.

Fifty sessions will explore five areas of computer science and technology, including hardware and computer architecture, software systems, computer networking, information management and management acceptance.

As an adjunct to the regular conference program, six special sessions will cover a major review of computers and personal privacy, a three-part session marking the tenth anniversary of the Dartmouth time-sharing system, an overview of energy in an evolving society, plus discussions of computer communications in a regulatory environment, computer development and applications outside the U.S., and computing in mathematics in society.

# Calendar

March 4-5, Chicago, Ill. – **NAPL Symposium.** "Computerized Estimating . . . Fact vs. Fantasy." Contact: NAPL, 230 W. 41st St., New York 10036.

March 12-15, Zurich, Switzerland – **1974 Zurich Seminar on Digital Communications.** Contact: Secretariat, 1974 International Zurich Seminar, Institue fuer Fernmeldetechnik eth, Sternwartstrasse 7, CH-8006.

March 12-15, San Francisco – **Fourth Annual National Educational Technology Conference.** Contact: National Educational Technology Conference, 140 Sylvan Ave., Englewood, N.J. 07632.

March 13-14, Chicago – **"Applying Computer-Aided Manufacturing to Assembly Operations."** Contact: Eugene L. Magad, IIT Research Institute, 10 W. 35th St., Chicago, Ill. 60616.

March 18-20, New Orleans – **Honeywell Users Group.** Contact W.L. McNamar, Certified Grocers of California, Ltd., 2601 South Eastern Ave., Los Angeles, Calif. 90040.

March 18-20, Toronto, Canada – **Systems Forum "Beyond 1974."** Contact James F. Foley, Systems and Procedures Division, LOMA, 100 Park Ave., New York, 10017.

March 18-22, New Orleans – **USE Spring Conference.** Contact: John H. Farber, USE, Sperry Univac Division, Sperry Rand Corp., P.O. Box 500, Blue Bell, Pa. 19422.

# Society Sundries

## IEEE Honors Three

NEW YORK – The Institute of Electrical and Electronics Engineers (IEEE) will present several awards during 1974, honoring outstanding people in fields of special interest to its members.

The Mervin J. Kelly Award for outstanding contribution in the field of telecommunication will be presented to Leon S. Nergaard "for outstanding contributions and leadership in the introduction of very high frequencies for telecommunications." Nergaard was director of the Microwave Research Laboratory, RCA, prior to retiring in 1971.

The Morris N. Liebmann Award, will go to Willard S. Boyle and George E. Smith of Bell Laboratories "for the invention of the charge-coupled device and for leadership in the field of MOS device physics."

– – –

Allen Burris, Northern Trust Co. of Chicago, has been elected to a two-year term as president of Guide International Corp.

– – –

Digitronics Users Association (DUA) has changed its name to Iomec Users Association (IUA) and voted to appoint an executive advisory committee.

– – –

A Microdata Users' Group has been formed to exchange information concerning the development of high level languages and compilers, emulation of other computers, data communications applications and other areas of user interest in software and firmware.

Further information about the group is available from Dr. Ted Lewis, Computer Science Dept. University of Southwestern Louisiana, Lafayette, La. 70501.

– – –

The Computer Operations Management Association (Coma) of Chicago has elected Edward J. Mrowiec, of American National Bank and Trust Co., president for 1974.

– – –

Data Processing Management Association (DPMA) is offering two new video programs, one on "Management for Success" and the other on "Data Communications."

– – –

William E. Perry has been named director of research for the Institute of Internal Auditors, Inc. He will concentrate on research projects and EDP auditing techniques.

– – –

Vaughn G. Alexander of the American Medical Association has been elected to the Board of Directors of The Society for Computer Medicine.

## When Emergency Strikes...

# Could Staff Evacuate, With Data, in 20 Minutes?

Special to Computerworld

MINNEAPOLIS – How safely and quickly could your DP staff evacuate – itself *and* critical data – in an emergency?

For Northwest Computing Services, Inc., it took 20 minutes when a 2 a.m. blaze in an adjacent hotel here forced the firm to vacate its facility recently. If not for the existence of emergency guidelines, the process might have been both chaotic and costly, noted John R. Nugent, manager of the firm's regional operations department.

### Chain of Command

Upon instructions from the fire department to evacuate, Nugent related, the shift supervisor notified his supervisory personnel, the supervisor of a remote center based in the same building and personnel of a microfilm service bureau. He then informed the operations manager, who in turn contacted the firm's president. Other corporate officers were reached to determine if they had any data demanding attention in the office.

The sweep of crucial material then began by removing all system and library packs, transaction and other essential files from the drives. These were quickly logged and transported to an off-site vault. All other tape files were loaded on carts and moved to NCS' on-site fireproof library.

The supervisor then closed the library, sending personnel from the building. Eventually, all but a core group were sent home until operations could be resumed.

Meanwhile, the production control department was notifying and signing off all remote teleprocessing users. They also gathered and moved off-site all production JCL, documentation manuals, personnel files, system maintenance logs and jobs awaiting processing and verified the removal of all data files from the computer room.

The master scheduler immediately stopped all jobs in the system, subsequently enabling the facility to resume operations with minimal reruns. In machine operations, a Honeywell 6040 and IBM 370/158, 370/155, 360/40, sixty, 3330 disk drives, 20 tape drives, printer room hardware and teleprocessing equipment were all powered down.

By this point, firefighters had entered the building and determined that on floors facing the fire, the intense heat had cracked the windows.

The I/O department, meanwhile, carted and moved off-site approximately 250,000 already processed checks and deposits, printed reports and microfiche of 150 users. Once outside, police protection was secured for these items.

Time also had to be devoted to removing all support data, balance sheets, reentry documents, unprocessed items, maintenance items and payroll input. Finally, arrangements for later pickups were made with the firm's couriers.

### Backup Found

Before the extent of the disruption was clear, NCS contacted its vendor marketing representative, requesting backup facilities for use if necessary. He was able to secure alternate arrangements within four hours, Nugent noted.

When word came, three-and-a-half hours after the initial exodus had begun, that most of the premises could be safely reentered, staff members began returning the data. In another hour-and-a-half, Nugent noted, NCS was back in operation. All systems were brought up in about 20 minutes, and all scheduled work was released within four hours of the original schedule, he said.

Happily, Nugent observed, not every installation has to weather a similar crisis to appreciate the value of maintaining concise, thorough emergency procedures.

The following suggestions from NCS highlight areas deserving special attention when compiling emergency guidelines:

- Be sure all staff members are apprised of the procedures and can locate a copy readily.
- Develop a complete list of critical packs and tapes in the computer room.
- Develop a list of data to be removed from all other areas of the firm.
- Maintain a listing, with phone numbers, of all office and vendor personnel to be notified.
- Detail procedures for informing remote and teleprocessing users.
- Arrange for backup processing facilities and test them periodically. Make sure all the necessary hardware is included.
- Include any specific requirements your vendor might stipulate.
- Arrange emergency quarters for both personnel and data.
- Inform all personnel of the location and proper use of fire extinguishers on the premises.
- Distinguish among contingencies for differing emergency conditions.

## Traffic Jam Blamed on Wiring

GRAND JUNCTION, Colo. – Bad weather, faulty wiring and torn up detectors combined to produce a major traffic jam here recently, but all is running smoothly once again.

Grand Junction has a computerized traffic system in which traffic detectors implanted in the street count vehicles moving in the four directions and a controller, linked to a computer, selects a traffic timing plan.

Public Works Director Gus Byrom said there were problems for a while with incorrect wiring in the computer cabinet, but that has been fixed, as have the detectors which were torn up when the roads were repaved, necessitating manual operation for a period.

The only remaining problem is the "brutal winter." Motorists are driving more hesitantly and not pulling up as close to the corner as before and therefore not triggering the detectors.

"A major traffic jam occurred at what we locally call 'confusion corner,' " he said, "but we've put up signs with arrows saying "Stop Here" to take care of the problem."

## No Lack of Data Here!

DAYTON, Ohio – The University of Dayton's Research Institute has set up an on-line system to allow the institute to access eight data banks around the country.

The data banks include the National Technical Information services data base (unclassified research and development reports of the Federal Government since 1970); Chemical Abstracts Condensates (literature on chemistry and chemical engineering); Engineering Index; and Toxline, a set of six data bases concerned with toxicology.

Researchers may also access Biological Abstracts, Education Resources Information center, Inform (business information) and Georef (literature in geology).

The institute has made the on-line system available to any industry or researcher in the area, according to Fred Scheffler, project supervisor.

# Aussie Flood Damage to DP Put at $14 Million

SYDNEY, Australia – Men rowing around inside DP rooms and diving to retrieve files – this was one scenario of what was a "horror scene" after the recent Brisbane floods.

"The worst natural disaster ever to hit the DP industry in Australia," according to an IBM spokesman, the floods left damages to DP equipment totaling at least $14 million and possibly more.

Some 30 to 40 installations were hit, according to *The Australian Financial News*, ranging from Olivetti 603s to IBM 370/135s and an ICL 1902S.

Among the installations affected was the Burroughs state office which was flooded with five feet of water, the *Review* said. Here DP personnel swam and floated in rafts to retrieve equipment and files.

An ICL 1902S at QUF Industries Ltd. was under 12 feet of water, but an associate GCS key-to-disk system was dismantled and saved.

QUF's staff managed to save all the files and ICL has arranged for its work to be transferred to a compatible 1904 in the state treasury.

Five IBM installations were damaged to varying degrees by the flood waters.

One user dove into the room next to the computer room, swam underwater and retrieved the listings from a file cabinet, the *Review* said.

Bill Smith of IBM described the situation as "havoc," which "had to be seen to be believed.

"It was bad enough to have a system completely submerged, but the devastation the receding waters revealed was horrifying," he said. "Filing cabinets filled with punch cards had burst their seams, and the cards soaked and swelled."

IBM organized a massive replacement lift, according to the Australian newspaper, flying in keypunches and verifiers from Sydney to Brisbane, and a 370/135 at its Brisbane data center was immediately made available for customer use.

"It seems that Brisbane DP users generally managed to rescue their main disk and tape files before they were damaged and before their records were irretrievably lost, but few seem to have had sufficient backup archival records stored separately," Smith said.

Both Burroughs and IBM have flown additional engineering personnel to the area to help in the "recuperative" operation, the *Review* said.

# NSF Awards $280,400 For Program Research

WASHINGTON, D.C. – The National Science Foundation has launched a plan to improve the effectiveness of computer programs used widely in scientific research.

As a first step in the project, NSF awarded nine contracts totaling $280,400 to support a cooperative program to develop "accurate, consistent and well-documented mathematical computer programs" designed to provide researchers with basic numerical computations.

"Computer software for scientific research, as well as those for other applications, has developed chaotically over the last decade," NSF said.

Because of this and the particular importance for scientific research, NSF said it would make a special effort to improve the quality of basic programs used in different fields of scientific research.

Under the recently announced program, three institutions – Argonne National Laboratory, the University of Kentucky and the Jet Propulsion Laboratory of the California Institute of Technology – will develop the programs, while the other six organizations will field-test the software.

Errors in computer programs for scientific research may escape detection for months or years, NSF said, so a large part of the effort will go toward validating present programs in wide use, in addition to developing new systems.

In the past, the NSF said, it has had a great deal of success with its Software Quality Research Program.

In addition, the foundation said the program had resulted in the development of a new version of one widely used application in which the running time was reduced 5% over the time previously required – with increased accuracy included.

The six institutions that will act as test beds for the new project, which is funded by the NSF Office of Computing Activities, are the University of Southern California, Purdue University, Northwestern University, University of Wisconsin, University of Texas and the University of Toronto.

## NCIC's Up Goes Down

WASHINGTON, D.C. – Just as we all have our ups and downs, so does the FBI's National Crime Information Center (NCIC), in terms of the number of active records on file.

As of Jan. 1, there were 4,871,203 active records in NCIC as opposed to Dec. 1, 1973's landmark high of 5,014,385. The decrease in the total NCIC file size resulted from the scheduled January purge of certain vehicle, license plate and boat records.

## 'No Evidence of Unauthorized Access'

# L.A. Justice Systems Safeguards Called Adequate

By a CW Staff Writer

LOS ANGELES – Los Angeles County's criminal justice systems have adequate safeguards and protect the privacy of persons included in their data banks, according to a preliminary report submitted to the county's board of supervisors by Arthur G. Will, chief county administrative officer. The study was ordered by the board last fall after Los Angeles County Supervisor Baxter Ward became aware of the concern of several states over abuse of criminal history files [CW, Oct. 10, 1973].

**A Look at L.A. County**

After a "basic review" of security policies and procedures in the county law enforcement systems, the reviewers said they "have not found anything to indicate deficiencies in these policies and procedures nor have we found any evidence of unauthorized access to local data files."

However, further study of the matter on national and state levels is ongoing because "we don't really have any assurance that federal or state agencies are making proper use of the data that we're required to supply to them," according to Doug Steele, a spokesman for the review committee.

Los Angeles County has four significant on-line computer systems which are related to law enforcement, according to the study. Two are currently operational and two are expected to be operational by mid-1974.

The Automated Jail Information System (Ajis) provides "timely information on each jail inmate from the time he is booked into the county jail system until he is released." It assists with routine jail functions such as bookings, jail location, responding to requests for information on inmates, routing mail and assembling prisoners for court appearances.

### Inmate Data

One major purpose of Ajis is to make available to family members, attorneys and "other concerned individuals" certain inmate data. To ensure the security of the system, query and update functions are performed only by employees of the sheriff's department who are either sworn personnel or civilians supervised by sworn personnel.

Data is retained in Ajis for immediate access for 30 days following an inmate's release. It is then stored on magnetic tape in vault storage for statistical information but is no longer available to the public.

The Automated Want/Warrant System (AWWS) provides law enforcement personnel with ready access to information on wanted persons and vehicles, as well as outstanding warrants, according to the study.

A second county system, the Traffic Records System (TRS), "automates the processing of citations issued for moving and parking violations and for those traffic violations on which a city attorney or the district attorney files a complaint." TRS processes citation data from all county law enforcement agencies and disposition data from the various municipal courts to:

- Determine which citations have been legally disposed of.
- Prepare and input warrants into the AWWS for people whose citations are not disposed within legal time limits.
- Generate year-to-date files of citations and dispositions for use in calculating bail on new citations.

For security in the TRS system, terminal operators are either deputy clerks of the court, or employees of district attorney or city attorney offices. Traffic citation information is kept on-line for one year following its disposition. Warrants issued are kept on-line for five years. Upon expiration of these time periods, the data is completely erased with no other local record maintained.

The Juvenile Traffic Citation System (JTCS), expected to be operational by mid-1974, will automate the courts' current manual records system containing complete information on all juvenile traffic citations issued to resident minors under 18.

JTCS security is provided by placing the terminals in one physical location "under direct control of authorized court personnel." Furthermore, juvenile records will be purged when the individual reaches 18 years, three months of age and has no outstanding citations. For those who reach this age but have outstanding citations, their records are retained until 21 years, three months of age, unless the citation is disposed of earlier.

The Automated Index (AI), currently under development by the sheriff's department, should be in operation by July 1974. The AI will eventually replace many of the current manual name indexing and fingerprint reference systems of the sheriff's department and similar files of the Los Angeles Police Department.

Files currently being developed to support this system, according to the report, will contain "summary personal history data that can be used to obtain positive identification of individuals under arrest or investigation" and summary data on "criminal incidents essential to the justice process" and which can be used for investigative purposes. The system's final configuration will interface with other justice systems such as Ajis and AWWS.

As with Ajis, AI terminal operators will be sworn personnel or civilians supervised by sworn personnel. In addition, each operator will be limited to handling data for which he has prior clearance and a need to know. There will be four levels of data classification in terms of its confidentiality, and the operator will not be able to access data which exceeds his security clearance.

The system is programmed with a series of security tests which must be satisfied before the data can be accessed. The tests include a system password, an employee password and number, an identification code for the user terminal and the previously authorized security clearance.

## DP and Contracting — Part II

# Software Taxes Can Be Avoided

BOSTON – "Full unbundling in purchases and splitting maintenance charges from rental charges in leases can result in substantial tax savings for computer users," said Roy N. Freed, in a recent interview.

The Boston attorney was discussing ways and means of avoiding software taxation.

An understanding of the legal bases of the various types of taxes and careful preparation for particular transactions can be the bases of savings, Freed said.

The savings could involve state sales taxes and local personal property taxes, he added.

State sales taxes, essentially but not exclusively, apply to transfers of tangible personal property, Freed stated, as distinguished from personal service transactions.

Local personal property taxes, however, are in the form of annual levies on the current values of properties.

"The application of these taxes is in flux," Freed said, "as tax collectors are becoming more aware of the computer industry and attempting to formulate regulations."

The aggressiveness of tax collectors in California, Freed noted, is having an important influence on decisions in other states.

A California software bill exempts from taxation, as tangible personal property, all software except that classified as "basic operational," he noted.

The way to reduce the size of costs attributable to tangible personal property is by full unbundling, as Freed sees it.

Software programs represent a major item which has to be characterized accurately for legal purposes, Freed said, affirming that the California decision might not be the optimum one for computer users.

The "political compromise by Wema and others" in California, in securing a statutory exemption from the personal property tax, still leaves open the question of sales taxes, he said.

A further example of the cost of ignoring sales taxes is the case of time-sharing operations. These, in many cases, treat the entire charges as terminal rental, even though the use of special, valuable data bases is involved. This, he maintained, inflates sales taxes unnecessarily. The proper charges for terminal rental alone would be nominal, Freed stated.

"Customers must act to protect themselves," Freed warned, since sales tax collectors have been know to ignore the actual statutory authorization and extend their tax-collecting activities beyond them.

If they get away with this type of activity, it is because the taxpayer – the computer user – has failed to examine and recognize the scope of taxes, Freed stated.

## Food on Your Mind?...

WEST CALDWELL, N.J. – Ever see a fat computer? Probably not, so maybe this time you should follow this diet.

Time Pattern Research, Inc. is offering a personalized, computerized diet, tailored to the individual's food preferences.

Dr. Georgina Faludi, director of the Obesity and Diabetic Clinic at the Hahnemann Medical College and Hospital in Philadelphia, developed a questionnaire designed to make dieting easier.

The questionnaire asks certain medical questions – "are you diabetic? how long have you been overweight?" – as well as probing your habits – "do you eat during the night? do you exercise regularly? how many hours do you sleep per day?"

It also asks you to check off 196 foods on the basis of "like to eat often, like to eat occasionally, eat if I have to" and "absolutely dislike or allergic to."

After the data is input, the firm's IBM 360/40 prints out a 21-day diet, with a special introduction keyed to the individual's habits – telling him or her, for example, to eat more slowly and use less salt.

## ... Smoke in Your Eyes?

DETROIT – Trying to kick the nicotine habit without success? Maybe what you need is an addiction index.

Richard Huebner, a financial adviser, has come up with a Smoking and Health Community Program which attempts to construct a personal computerized smoker's profile telling, among other things, the amount of money a smoker has spent and will spend on cigarettes and the number of years smoking has cut off his life.

The most important part of the profile, Huebner said, is the schedule of withdrawal based on the individual's addiction index. The average schedule would, over several weeks, gradually reduce the number of cigarettes smoked until he kicked the habit.

Each program consists of weekly classes.

## Police Professionals Join MIT Researchers On Urban Safety Plans

BOSTON – Nine police professionals, three of whom are DP specialists, are providing police-level input to MIT researchers studying the planning and resource allocation functions of urban public safety systems.

The police are stating their needs for the future, but not, according to an MIT spokesman, necessarily as official spokesmen for all police departments.

The two-year effort will include an analysis of how to evaluate the operational effectiveness of urban emergency systems; the development of models as planning, research and management tools for use with such systems; and an evaluation of the impact of new technology and new forms of operation on these services.

Capt. Daniel Cawley, Management Information Systems Division, New York City Police Department; Inspector Herbert F. Miller Jr., director, Operations Planning and Data Processing Division, Metropolitan Police Department, Washington, D.C.; and Chief Joseph McNamara, Kansas City Police Department, are participating in what is described as an "ongoing cooperative program" funded by the National Science Foundation.

## Looking for a Stolen Bike?

WASHINGTON, D.C. – The attendees of the 1973 National Crime Information Center (NCIC) all-participants' meeting voted unanimously to establish a new category in the NCIC Article File to accommodate special article coding for stolen bicycles, effective April 1.

# BEFORE YOU KNOW IT, IT'S BEFORE YOU.

**Now's the time to make your plans to attend The Computer Caravan Computer Users' Forum and Exposition when it comes to a city near you.**

Don't wait till the last minute. Now's the time to make sure your schedule includes a visit to the computer show that has already benefited more than 40,000 computer users in its first two years. Here are some of the details of our updated '74 program.

# THE FORUMS user-to-user in '74

The Computer Users' Forums give you a unique opportunity to exchange information with other users and independent experts about current practical problems. Forums run from 9:00 A.M. to 2:30 P.M. each day, including an opening report, panel discussions, morning and afternoon workshops and luncheon. If you register in advance for the User-to-User Forums, *you'll save $5 per day* from the price at the door. If you attend all three days, *you'll save $15*, just for acting early. (Note that no advance registration is required if you attend the Exposition only).

## Here are the Forum topics for '74

**First Day** — **Source Data Automation Today**
with workshops on
Point-of-sale, Intelligent Terminals,
Optical Scanning and Off-Line Key Entry

**Second Day** — **Data Communications Update**
with workshops on
Network Planning, Front-End Processors,
On-Line Systems and Equipment Selection

**Third Day** — **Operations Management**
with workshops on
Performance Measurement, Project Control,
Multi-Vendor Installations and Small Centers

## Free afternoon sessions

Each day an important, current topic is discussed in an open afternoon session at 2:45 P.M. — free to all Caravan attendees. In 1974 we'll be looking at:

FIRST DAY — Personnel
SECOND DAY — Data Communications
THIRD DAY — Data Base Design

**The Computer Caravan/74** sponsored by **COMPUTERWORLD**

# THE EXPOSITION a business show, not show business

From 10 A.M. to 6 P.M. each day, you'll have a unique chance to see and compare the latest EDP equipment and services in a pleasant, *uncrowded* exhibit hall. You'll see everything from complete systems, to independent peripherals, to software to terminals. And you'll be able to talk specifics about your problems and needs with knowledgeable representatives of leading EDP companies. Because The Caravan has a total of 30 show days in ten cities, no one day is too crowded. The whole Exposition is designed to let you get the facts you want from the people you want to see. And the people you want to see will be there. Here's a partial list of the companies that we'll be keeping on our '74 tour:

*American Telephone & Telegraph Company • Anderson Jacobson, Inc. • Auerbach • BASF Systems • Boeing Computer Services, Inc. • California Computer Products, Inc. • Centronics Data Computer Corporation • Cincinnati Milacron • Complanco, Inc. • Computer Devices, Inc. • Computer Transceiver Systems, Inc. • Control Data Corporation • Cullinane Corporation • Data General Corporation • Decision, Inc. • Delta Data Systems Corporation • Digital Equipment Corporation • Electronic Memories & Magnetics Corporation • General Computer Systems, Inc. • Gould, Inc., Data Systems Division • Hazeltine Corporation • Hewlett-Packard Company • Incoterm Corporation • Interdata, Inc. • Intertel • International Communications Corporation, a Milgo Company • Iomec, Inc. • Lockheed Electronics Company • Modular Computer Systems • MSI Data Corporation • Pansophic Systems, Inc. • Penril Data Communications, Inc. • Pertec Corporation • Prime Computer, Inc. • Quantor Corporation • Raytheon Data Systems • Raytheon Services • Scope Data, Inc. • Shugart Associates • Stromberg DatagraphiX, Inc. • Sycor, Inc. • Texas Instruments, Inc. • University Computing Company • Western Union Data Services Company •*

## Act now

If you'd like to attend The Computers Users' *Forums*, just fill out the registration form and send it in as soon as possible. Remember, advance registration for the Forums saves you $5 per day. If you wish to attend only the *Exposition*, no advance registration is required. Just mark your calendar for the city and dates you want to attend and come to the location indicated in the complete schedule.

## FORUM REGISTRATION USER-TO-USER IN '74

TO: FRANI BLACKLER, THE COMPUTER CARAVAN/'74
797 WASHINGTON STREET, NEWTON, MASS. 02160 (617) 965-5800

Please register me for the forum(s) indicated. I understand that this includes luncheon, workbook and admission to all three days of the Exposition. My check or purchase order is enclosed.
*(No advance registration is required for the Exposition only.)*

☐ First Day — Source Data Automation Today
☐ Second Day — Data Communications Update
☐ Third Day — Operations Management

**Check city**

| | | |
|---|---|---|
| ☐ Cincinnati | Feb. 26-28 | Cincinnati Convention Center |
| ☐ Houston | Mar. 5-7 | Albert Thomas Convention Center |
| ☐ Anaheim | Mar. 19-21 | Anaheim Convention Ctr. South Hall (Exposition) Sheraton Anaheim (Forums) |
| ☐ San Francisco | Mar. 26-28 | Civic Auditorium |
| ☐ St. Louis | Apr. 3-5 | Ghase Park Plaza Hotel |
| ☐ Chicago | Apr. 9-11 | Hyatt Regency O'Hare |
| ☐ Boston (Woburn) | Apr. 15-17 | Northeast Trade Center (Rte. 128, Exit 39 or 40) |
| ☐ Charlotte | Apr. 23-25 | Charlotte Convention Center |
| ☐ New York | Apr. 30-May 2 | Americana of New York |

Total number of days registered____ times $30 = $____

☐ *Check enclosed*

☐ *Purchase Order enclosed*

**Registration at the door: $35 per day**
**Advance registration: $30 per day**

*For additional registrations, please copy this form.*

**Name** _____

**Title** _____

**Company** _____

**Address** _____

**City** _____

**State** _____ **Zip** _____

*Please circle one number in each category so that we may better serve you.*

**INDUSTRY**

01 Mining/Construction/Oil & Refining
02 Manufacturing — Computer or data system hardware/peripherals/other associated mechanical devices
03 Manufacturing (other)
04 Utilities/Comm. Sys./Transportation
05 Wholesale/Retail
06 Finance/Insurance/Real Estate
07 DP Serv. Bureau/Software/Planning
08 Business Services (except DP)
09 Education/Medical/Legal
10 Federal, State and Local Government
12 Communications/Printing/Publishing
13 Other____

**FUNCTION**

01 Corporate Officer
02 Data Processing & Operational Management
03 Data Processing Professional Staff
04 Consultant
05 Lawyer/Accountant
06 Engineering-Management Scientific/R & D
07 Sales/Marketing/Account Executive
08 Librarian/Educator
09 Other____

## Responsibility, Passwords,...

# Security Controls a Must for Remote Terminal Use

TORONTO, Ont. – A simple way to determine the security of your computer system is to check it against the following list of security "musts" concerning remote terminal controls:

- Delegate responsibility for security throughout the line organization to those managers who have direct control of the data.
- Install terminals in safe locations with locked or guarded entrances.
- Provide for constant attendance and supervision of terminals during working hours; lock the terminals after normal working hours and issue keys to valid users.
- To protect network security, design systems so that terminals identify themselves and their operators at the sign-on time, or as requested by the system, or after the system detects that communications have been interrupted.
- Use scramblers or cryptography to thwart wiretappers.
- Use machine-readable cards or badges, which can be issued and collected at each use, to identify terminal users for every task or job performed (i.e., for accountability and authorization); change identification cards periodically; and establish procedures for reporting the loss of a card and for taking action.
- Assign passwords which can be related to authorized codes stored in the computer system.
- Distribute passwords in a form that can be conveniently kept and carried by the users, but that cannot be easily deciphered by someone finding a lost password; change passwords periodically.
- Inform the personnel who use terminals of their need to prevent unauthorized users from gaining access to the computer systems.
- Establish procedures for ensuring that users sign off before leaving a terminal and that they remove all paper, including carbons or ribbons, which should not be seen by subsequent users.
- Design systems so that terminals are automatically disconnected if they are left unattended for a specified time.
- Design transmission facilities so that transmission errors are detected and corrected automatically.
- Use techniques such as record counts of input transactions, message verification, sequential numbering of input transactions, and storing of input transactions on tape or disk for future reference along with the data and time of the request, the user's identity, the authorization code, the file accessed and the function performed.

This checklist was compiled by DCF Systems Ltd., 74 Victoria St., Toronto, Ont. M5C 2A5.

# Road Designing Gets Attention

PARIS – Computer programs to be used by road designers worldwide are being developed by the Organization for Economic Cooperation and Development (OECD).

A Road Research Group was founded by OECD specifically to study the optimization of road alignment with computers, to review the theory and practice of this technique and assess its usefulness.

The group, representing the 24 member nations, has defined optimization as "a method of getting the best solution to a problem with many solutions," and in this case, designing a road such that the cost involved is as low as possible.

To date, according to the group, several optimization techniques exist, and programs to treat a vertical alignment are common in the UK and France, and at an advanced state of development in Denmark, Germany and the U.S.

In the early sixties, computers were used mainly in routine calculations. Today, however, programs cover road design from the geodetic and mapping procedures to the optimization of earthworks.

The major applications of the computer methods within the highway design field, according to an OECD report, include the reduction of survey data and mapping procedures, calculation of horizontal and vertical geometry and the handling of terrain data using digital terrain models, including the treatment of different types of soil.

Computers also assist in calculations of cross-sectional data and earthwork volumes, in slope-stability analysis, the design of drainage systems and in automatic drawing.

The group concluded that all OECD member countries have basically similar road design problems and therefore would benefit from optimization programs, with the selection of the most appropriate program left to the individual nation.

A copy of the report is available from the Director of Information, OECD, 2 Rue Andre-Pascal, 75775 Paris Cedex 16, France.

# Aussies Slowly Ease DP Staff Shortage

SYDNEY, Australia – A placement organization here seems to be doing its part to relieve the DP staff shortage in Australia.

American-Australian Executive Placement [CW, Oct. 31] has placed at least five DP people from the U.S., according to chairman Gordon Hooper, and hopes to place another 10 "within weeks."

Over 600 jobs have been offered to interested parties in the U.S. and elsewhere, Hooper said, saying he expected the offers would result in some 25 to 30 more professionals coming to work in Australia.

Of the five already placed, one joined Datec, a consultant firm; one went with Honeywell Information Systems; and a third joined the Bank of New South Wales.

The fourth immigrant, Ian Pratt, president and founder of Mallion Computer Management of California, will join Hoyle, Rofe and Co. as senior consultant in charge of major software projects, Hooper said.

A fifth DPer is considering three "very firm offers," according to the placement company.

# COMPUTER INDUSTRY

## CI Notes

### Bunker-Ramo Reaps Contracts

CHICAGO – Some 200 employees out of the 600 laid off Jan. 23 are returning to work at Bunker Ramo Corp.'s Trumbull, Conn., plant.

The company announced the signing of two contracts for brokerage and banking-information systems, one for $14 million from Pershing & Co., a brokerage firm.

The other contract is from Franklin Savings Bank of New York City, which is installing an on-line system of BR2001 teller terminals in all of its offices.

### Singer Orders REI Wands

DALLAS – Recognition Equipment has received an order from The Singer Co. for up to 50,000 handheld OCR wands to be used with Singer's point-of-sale terminals.

The contract, valued at $7.5 million, is the second REI has received recently. NCR had previously contracted with the company for OCR wands for its POS systems.

### Memorex Selling MRXs

SANTA CLARA, Calif. – Although Memorex was unable to find any major purchaser for its MRX 40 and 50 mainframe systems line, it is closing out its inventory (100 systems were built) by selling the CPUs with "heavy negotiated discounts" in lots of one and two machines.

### NCR Revamps Field Forces

DAYTON, Ohio – NCR's U.S. field-engineering force personnel will now specialize in one of three areas – computers, terminals and other data entry devices and stand-alone business equipment of various types.

The administrative structure of the division has been reorganized to provide more direct reporting responsibility and to improve the effectiveness and efficiency of customer service, according to George O. Harmon, vice-president, domestic field engineering.

To reflect this new direction, the Domestic and International Technical Service Divisions have been renamed Field Engineering Divisions.

## Supershorts

Advanced Memory Systems, Inc. has gone to a three-day work week for all of its assembly employees. The company reported 20% more facility time without any increase in energy consumption.

– – –

Control Data Corp.'s Peripheral Products Co. has combined its OCR Division, Washington Metropolitan Area Transit Authority program, and Capital Facility in the Washington, D.C., area into a single operation.

– – –

Information Magnetics Corp. has formed a Video Components Group.

# Components Crunch Hits Peripherals

## CRT Makers Buy Plastic Direct

By Molly Upton
Of the CW Staff

NEWTON, Mass. – Deliveries of CRTs are being made on schedule by many vendors, but several firms surveyed by *Computerworld* indicated they are going to greater lengths to keep their delivery dates.

Ordering components is now done anywhere from a year to two years in advance by all those contacted and many firms have entered blanket orders for supplies.

Changing component ingredients, buying one's own stock of plastic directly from a supplier and paying a premium for parts are all part of the game of manufacturing now.

Many of the companies consider themselves well off, as they had already entered large orders before the recent petroleum crisis.

Most said they saw the industry entering a boom period, and had ordered large inventories.

There is no doubt about it, the oil crunch has evolved quickly into a plastics shortage, and parts with plastic, including ICs, are getting hard to come by, not to mention key caps and casings.

"We almost ran into trouble with key caps, but we had just gone through a reevaluation of our own and decided to go to a different color, and that one happened to be the one that our vendor picked out as the most easily produced during this crisis," John Jamieson, TEC sales manager, added.

"We had no foreknowledge of this at all. It just worked out that way," he said.

Both Courier Terminals and Applied Digital Data Systems (Adds), Inc. have gone directly to plastics suppliers and procured lots for use by their molders of CRT covers.

"We're protecting ourselves. Rather than let the molder order the materials, we're ordering it ourselves, to make sure it's allocated for our products," said James Kelly, general manager at Adds.

Adds purchases keyboards as a complete assembly. "We have visited our supplier of keyboards and questioned availability of materials for key tops. It too has

*(Continued on Page 39)*

## Printers Seeking Alternatives

By Toni Wiseman
Of the CW Staff

NEWTON, Mass. – Long lead times and components shortages are forcing printer manufacturers to hustle for supplies and to test for alternative materials, a recent *Computerworld* sampling indicated.

Lead times have gone up for capacitors, micro-circuits and other components, the manufacturers agreed. "Lead time for transistors is 26 weeks," George Masurat, vice-president, manufacturing, for Potter Instrument Co., said.

The components crunch has not disrupted delivery schedules as yet, the printer companies said, but things will be even tighter in the future. One source said he thought the situation would ease later in the year but admitted the prediction was based on emotion and not an industry study.

"We've had to bring some more exotic things in-house, such as tooling and numeric control, to reduce production time and offset long lead times," Masurat said.

In some instances components are not only hard to get, but vendors want long-term commitments.

"We have to sign longer contracts and commit ourselves earlier to keep our place in line with the vendors," said Howard Rose, vice-president, manufacturing, for DataProducts.

These longer contracts are forcing the smaller companies to make commitments for materials, to project and establish blank orders when they still have to watch their cash flow, one manufacturer said.

Many manufacturers are looking for alternatives to current components.

**Substitution Play**

David Moulton, vice-president, operations, for Tally Corp., said his company had substituted one kind of plastic for another because of the different lead times.

DataProducts is also doing some testing, evaluating the qualifications of possible alternate materials in the petrochemical area, Rose stated.

"We're doing a study on waterbased paint right now," he said, "but have not yet made a change."

Masurat commented that the components shortage had forced his company to pick up some items from a distributor rather than getting them from the manufacturer, and this means paying a higher price.

The only manufacturer contacted who seemed to feel secure was Centronics. "Our situation is not bad at all," said Jim Pitts, vice-president, manufacturing, "because we had the good foresight two years ago to sign long-range contracts. Our stockrooms are bursting."

## IBM, U.S. Subpoena Date Revised

By Molly Upton
Of the CW Staff

NEW YORK – Attorneys for IBM and the Justice Department were given a week in which to revise the subpoena recently served to 11 U.S. mainframe makers, including IBM, requesting information on product revenues and market shares.

Judge David N. Edelstein set a new timetable allowing for the revision of the subpoena and responses to it. The government and IBM were ordered to revise the subpoena by Feb. 22, and the firms will have until March 8 to indicate intentions to file a motion to object. They must file the motions by March 19.

Although this schedule extends the dates for responses by the 11 mainframers involved, IBM, Justice and third-party attorneys agreed a revised subpoena that would hopefully pare down the issues would save time in the long run.

Thomas Barr, lead attorney for IBM from Cravath, Swaine and Moore, said he foresaw many firms filing a motion to object.

In a courtroom crowded with the entire corporate counsel of most of the mainframers involved, there were three parties present at the central table: attorneys from IBM, Justice and an attorney representing the independent mainframers.

The firms being subpoened are: IBM, Burroughs, Univac, Honeywell, NCR, Xerox, Singer, CDC, RCA, GE and Digital Equipment Corp., which was to receive its subpoena Feb. 15, the same day as the hearing.

Everyone in the courtroom was acutely aware of the potentially smothering mound of papers that could be produced in response to the original subpoena.

CW Photo by M.Upton

**Ray Carlson and Joseph Widmar, attorneys for the Justice Department.**

"However badly I may want the evidence, when it gets to a certain size, that's the end of it. We can't plow through it and prepare it in any evidentiary form," Barr stated.

"It's really a question of how much can one seriously think the Department of Justice can get its hands around and prepare intelligibly by Oct. 7," he added.

He was making the motion for a revised subpoena because compliance with the original would be a "threat to the discovery process. Not because it would be a threat to IBM; but no one, not all of Justice Department and FBI, could possibly use all the information requested," he said.

"IBM," he added, "does not need a postponement answering" the old subpoena.

Carlson made it clear that the government's objective is not mounds of unintelligible material. "The government will

*(Continued on Page 39)*

# GCS Finds Distributors One Way to Go Multinational

By Toni Wiseman
Of the CW Staff

DALLAS – Most small- to medium-size companies can't afford to have their own multinational operations, according to Dallas L. Tally, vice-president of General Computer Systems (GCS).

CW Photo by Leslie Flanagan
Dallas Tally

There are two ways a company can finance its corporate growth, he noted.

"The first way is to raise a lot of money and set up your own international operations," Tally said.

"The advantages of this are that you keep all the profits."

The disadvantage, however, he said, is the amount of capital it takes to get into all the different countries at the right time for market penetration. "Unless you have $50 million to $100 million in capital ready to spend, you can forget it," Tally said.

The second way to expand into a multinational is to establish distributors. This is the route GCS has chosen.

Tally noted it is important to find companies which can make commitments for long-range marketing and support.

"Using distributors gives you a much better control of cash flow," he said, "because the distributors pay on a letter of credit or transfer of funds. They have total marketing and marketing support responsibility."

The disadvantage of this system, Tally warned, is that the distributor has to make enough profit to support its own organization, so the vendor can't expect the same gross profit as from his own marketing.

GCS operates on the principle that it will realize its profit from the hardware, and the distributor will get its profit from the support, Tally noted.

"The key item in any distributor relationship is that it cannot be done at arm's length," Tally cautioned. "You have to look at each year separately, look at the competition, the exchange rate, etc."

GCS treats its distributors much as it does regional offices, he said. In other words, they meet about every six months to discuss marketing and product planning.

A distributor relationship is faced with three basic problems, according to Tally.

"First of all, both companies must be able to make an operational profit.

"And they must also be able to compete with companies which do not have to make a break-even profit," he said.

The third problem is that the relationship is at the mercy of exchange rates and currency fluctuations.

On the positive side is the cash flow.

"If we were marketing or leasing all these systems ourselves, the amount of cash necessary to finance our growth would be far in excess of what it is now," Tally said.

"And is that the best place to put our cash? We think it would be better to develop new product lines to remain competitive." GCS' distributors currently handle about 50% of production, Tally said, though they have accounted for 60% to 70% in the past.

GCS currently has four distributors – Interscan, UK; Matra, Benelux and Italy; Dataprep, Hong Kong and Singapore; Datanamics, Australia – which account for 10 systems each month.

Negotiations are in progress with distributors in Japan, Brazil and Germany, Tally said.

Tally sees the 50-50 mix of distributors and company – with an average 20% a year growth – as just right for a controlled market.

"This gives you capital to work with, helps with planning, gives you shipping and delivery flexibility, and can also help with international financing," Tally concluded.



## IBM Subcontracts Brandon for Teale

SAN FRANCISCO – Brandon Applied Systems, Inc. has been awarded a $4.7 million contract from IBM for program and systems conversion.

The contract, the largest in Brandon's history, is a subcontract for work in the establishment of the Stephen P. Teale Consolidated Datacenter.

The contract calls for the conversion of 2,792 programs within 14 months.

### Other Contracts

Energy Conversion Devices, Inc.'s Read-Mostly Memory Division has been awarded a $304,000 contract by Burroughs Corp. for the development of semiconductors designed to Burroughs' specifications.

In connection with the contract, ECD granted Burroughs a worldwide nonexclusive patent license with respect to the memory chips.

**Xynetics, Inc. has received a contract, in excess of $2 million, from DHJ Industries, Inc. for automatic plotters to be used in a marker making system.**

GTE Sylvania, Inc. has been awarded a $1.6 million contract by the Air Force to provide keyboard printers and engineering services for use in the Minuteman intercontinental ballistic missile system.

**Computer Sciences Corp. has been awarded a contract by the U.S. Naval Electronic Systems Command to provide technical support and management assistance to the command's Special Communications Project Office.**

## Contracts

## Sperry Names Woman

NEW YORK – Sperry Rand Corp. has named a woman to its board of directors.

Norma T. Pace, an economist specializing in marketing forecasts, has been associated with Sperry for 15 years as a consultant. She is also an economic consultant for General Motors Corp., American Motors Corp., Chrysler Corp. and General Electric Corp.

At the annual meeting last July, some shareholders attacked the firm for not having a woman on its board.

# Cary Assures Shareholders Continued Bright Future

ARMONK, N.Y. – IBM President Frank T. Cary devoted a considerable portion of the president's message to shareholders to the topic of litigation developments concerning IBM over the years.

In fact, a discussion of antitrust suits and public attitudes about large corporations occupied about 10 inches of type, whereas a recounting of the year's financial achievements took about eight inches.

"I am confident that the Company's future remains bright for our stockholders, our employees and our customers," Cary said.

On the ruling in the Telex case, he said, "We believe the antitrust ruling against IBM is erroneous both in its theory of antitrust law and its interpretation of IBM business practices, and on Nov. 30, 1973, our request for an expedited appeal was granted by the Court of Appeals for the Tenth Circuit."

There are several factors responsible for the proliferation of antitrust suits against IBM in the recent months, he observed.

"The most obvious reason is that the adverse Telex antitrust decision has prompted other companies that sell IBM-compatible equipment to take advantage of the decision and seek to use it as a precedent," he observed.

"A less obvious reason is an increasing distrust of large institutions, a feeling that 'bigness is badness,' " which has encouraged small companies to begin antitrust suits against larger competitors.

"In addition, our industry includes a number of companies, like Telex, that have chosen to rely on IBM-developed technology for their products.

"Some of these companies claim that IBM's efforts to introduce a new technology and to stay competitive in price – the kind of efforts that have been considered normal by most companies and industries – are now illegal acts against them," Cary noted.

"This doesn't make any sense to us. We continue to believe we have competed fairly," he said.

No provision has been made in the financial results for the contingent liability associated with the Telex litigation, the report said.

"It is presently contemplated that any amounts which may ultimately become payable would be reported as a restatement of the earnings of the applicable prior years," the report continued.

Overseas operations continued to play an increasingly important role, with earnings from the foreign sector increasing $165.9 million over those of 1972 to $852.5 million, while corporate earnings rose $296.2 million over the previous year to $1.575 billion.

Operations outside the U.S. showed a higher rate of increase over 1972 than domestic operations, due in part to numerous currency fluctuations and realignments during the past year.

# IBM, U.S. Subpoena Date Revised

*(Continued from Page 37)*

not find acceptable any company's presentation that doesn't enable [us] to get the best use of the material."

Although meetings thus far have been "somewhat inconclusive" . . . it is "incumbent on IBM and the government to get together and see what we can pare out, set priorities of both sides and agree on some of the matters at issue," Carlson said.

Another problem, Barr said, is the as-yet-unresolved definition of market share. "The U.S. is standing on various market definitions . . ."

"We have got to get it cut down in some way. We haven't figured out how to do it but haven't given up trying," he said, referring to meetings with Justice attorneys.

CW Photo by M.Upton

**Nicholas Katzenbach and Thomas Barr, IBM counsel, meet after recent hearing.**

### Staffing Differences

Again the difference in staffing by the Justice Department and IBM was made clear. Each is responsible for taking depositions. Barr said the program is going well "but slower than hoped for." He noted that Justice was having difficulty obtaining multiple depositions in regions outside of New York.

# CRT Makers Buying Their Plastic Direct

*(Continued from Page 37)*

planned and has an allocation of plastic squared away for at least a year and a half," he said.

"It's important to try to look ahead and protect yourself," Kelly said.

TEC standardizes the components used in its lines, "which has really helped," Jamieson noted.

TEC is still shipping its standard units 30 days after receipt of order "because we were in a solid situation with our suppliers." The firm anticipates reducing the lead time on its newer products from 60 to 30 days within six months, Jamieson added.

A spokesman for Beehive Medical Electronics said the parts shortage is "becoming a bother. We have had some items that we've had to hold for shipment, but up to this point by paying a premium, we've usually been able to pick up the parts, and not hold up delivery.

"Other than just the normal pains in the IC area, we're in pretty good shape," reported Cliff Klein, manager of materials at Data 100.

"Lead times are going out. All it means is you place your orders earlier over a longer period of time and watch the hell out of them. Followup is of the utmost importance today," he added.

And good rapport with the vendors helps, Klein observed.

Data 100 is ordering into 1975 for electronic components such as capacitors, resistors, diodes, chips and transistors.

"Last year there were very few orders out more than a year; now we're a year and a half, close to two years on some of them," Klein said.

Courier is ordering 12 to 14 months out, whereas a year ago the lead time was six months, said Jim Cogan, DP manufacturing for Courier Terminals.

Courier is adding more people to its purchasing staff in order to promote face-to-face contact with suppliers.

## Government Spent $26.6 Million on Hardware

# DP Costs Canada $29 Million

By T.M. Whiteman
Special to Computerworld

OTTAWA, Ont. – Canada's federal government spent more than $29 million in the private sector in the fiscal year ending March 31, 1973, for DP goods and services, the president of the Treasury Board told the House of Commons.

The government spent $26.6 million for computer hardware purchases for the year ending March 31, $240,000 for computer software and $2.8 million on DP consulting, according to C.M. Drury, president of the Treasury Board.

The five main suppliers to the government in descending dollar volume in the year ending March 31 were IBM Canada Ltd., Sperry Rand Canada Ltd., Honeywell Information Systems Ltd., Burroughs Business Machines Ltd. and Xerox Data Systems Ltd.

## International News

### 8250 Capacity Doubled

TOKYO – Hitachi Ltd. has doubled the memory capacity and disk capacity of its System 8250 general-purpose computer.

The maximum memory capacity has been doubled from 128K bytes to 256K bytes and the maximum capacity of the disk memory increased from 230M bytes to 800M bytes.

## HIS Pacific to Serve Australia, Asia

**WALTHAM, Mass. – Emphasizing the growing importance of markets in Australia and Asia, Honeywell Information Systems has established HIS Pacific.**

**Moving toward a closer relationship with corporate headquarters, HIS Australia will report directly to Pacific general manager J.M. Sterling, who will establish headquarters for the new division in Japan. Sterling will report directly to Honeywell's vice-president here.**

**Corporate plans call for a consolidation of Asian operations and an evaluation of new markets this year.**

**HIS Australia indicated the overall Australian computer market grew 17% in 1973 over 1972, and anticipates an individual growth this year of 14%, "give or take one or two either way," *The Australian Financial Review* reported.**

**HIS, which has been concentrating on marketing its lower range of computers in Australia, notably the G58, has expressed interest in selling more Series 6000 systems. Sales in this range have lagged behind results in other countries, according to the Australian paper.**

**Honeywell claimed 20% of the Japanese computer market and 17% of the Australian market, and said it would seek other Asian markets either through an agent or with a partner, most likely Nippon of Japan, the paper said.**

### Component Prices Rising in Japan

TOKYO – Quantities and prices of components and supplies are increasing in Japan. IBM Japan has raised its punch card prices an average of 43% as of the beginning of the year, and other firms have also raised prices, the report stated.

The price of fanfold paper has doubled in the past year, according to *EDP/JR*.

The production of silicon, used as the base of ICs and LSI, is diminishing. During 1973, production was estimated at 230 to 240 tons, but in 1974 it is expected to drop to about 190 tons because of short supplies of ingredients and the power crunch.

Magnetic tape prices are also rising.

The industry depends heavily on imports to supply most of its electric components. As much as 90% of ICs were imported last year.

From January through September 1973, Japan imported $152 million worth of tubes and semiconductors and $126 million of general electronic components, according to *EDP/JR*. The yen conversion rate used is 260 yen for $1.

### 35% Tariff on Disk Imports Irks Aussies

Special to Computerworld

SYNDEY, Australia – The imposition of a 35% tariff on imports of disk packs has brought varied reaction.

Importers regard the tariff as "unwarranted." One local assembler, Percy Boyden Ltd., which had applied for 25% protection, is upset by the size of the tariff.

Percy Boyden estimated that about 2,000 packs would be imported this year.

### Fujitsu Into Lasers

TOKYO – Fujitsu Ltd. has a prototype of a holographic memory system using a laser interlocked with a Facom 230-25 computer, according to *EDP Japan Report*.

The firm has also developed a 300mm by 300mm plasma display panel.

### MDS, AF Sign for Disks

UTICA, N.Y. – Mohawk Data Sciences Corp. (MDS) has been awarded a contract by the U.S. Air Force Accounting and Finance Center in Denver.

The contract is for seven disk storage systems, including 63 2700 drives and seven 2800 controllers. The MDS units will replace IBM 2314s and 2319s.

# Canada Mulls Steps to Strong, Indigenous Industry

MONTREAL – The Canadian Government plans to take several steps to foster a strong indigenous computer services and communications industry, according to M. Gerard Pelletier, communications minister.

The cooperation of industry, government and consumer is essential, he told the annual meeting of the Canadian Information Processing Society.

Pelletier indicated the government intends to use every stimulative means available and to "devise new ones that are better attuned to the new information age" to promote the Canadian DP industry.

However, in "situations where protective measures will not result in undesirable side effects, we will not hesitate to use them," he said.

"It should also be equally clear to multinational corporations that we expect that important parts of the data processing and of their system development will be carried out in Canada . . . In dealing with such corporations, it seems axiomatic that the countervailing power of government should be brought to bear in the national interest," Pelletier noted.

"To my mind, however, rational planning in the field of computer/communications does not imply any monolithic planning mechanisms or rigid government control.

"The hallmark of such planning is cooperation, and partnership, with the full involvement of industry, consumers and governments," he emphasized.

He noted that the government has disbanded its Computer Services Bureau, giving the business to the private sector.

"In the future, I expect that we will see an increasing use of Federal Government procurement to both strengthen and stimulate the Canadian computer/communications industry," he said.

Such moves will take into consideration long-term economic benefits, social needs and regional development possibilities, he said.

Decentralized computer networks is a concept currently being studied, Pelletier noted.

A group, in consultation with the carriers, is devising a plan for the development of a government data communications network that would hook together the dispersed computing facilities of the Federal Government, he said.

In addition, there will be discussions with the provinces to determine possibilities of joint federal-provincial programs in the shared use of DP facilities, he noted.

## Canada Shuts Its Service Bureau

OTTAWA, Ont. – The Canadian Government has closed the doors of its Computer Services Bureau here and turned the work over to private firms.

The move is seen as an indication of the government's intention to foster a healthy indigenous DP industry.

Annual revenues of the government bureau are estimated at about $4 million. All the bureau's former clients have been transferred to the private firms and the hardware returned to IBM Canada Ltd.

At least two large firms are sharing in the windfall: Computel Systems Ltd. and Systems Dimension Ltd., both headquartered here.

## UK T/S Firms Seek Backup

LONDON – With the energy crisis looming larger and larger, time-sharing firms here are looking around for sources of backup power, even though they are on the official list of electricity-cut exemptions.

Computer Time Brokers (CTB) is compiling an inventory of installations with time available, according to *Computer Weekly*.

Many of the companies on the list have their own generators or have assured their energy supply because they are on a hospital link.

CTB, according to the British weekly, is also investigating the possibility of going abroad for computer time. Two other brokers, Ordinateur Express, Paris, and Computer Express, Brussels, are also listing bureaus, banks and manufacturers with surplus time.

## Foreign Orders & Installations

Atomic Research Establishment Harwell, England, has ordered a Modular One system from Computer Technology Ltd.

– – –

Ayr County Council, England, has ordered a Honeywell Model 2040A system to replace a seven-year-old Honeywell 200.

– – –

SKM, a French painting equipment manufacturer, has installed an NCR Century 200 for order processing and payroll preparation.

– – –

Sumitomo Bank, Japan, has ordered five NCR 399 systems for installation in its overseas branch offices. Two systems will be installed in New York, two in London and one in Dusseldorf.

– – –

The Medical Research Council, UK, has ordered an HP3000 system from Hewlett-Packard for installation at the National Institute for Medical Research, where it will be used for scientific applications in time-sharing, batch and interactive modes.

# BEFORE YOU KNOW IT, IT'S BEFORE YOU.

**Now's the time to make your plans to attend The Computer Caravan Computer Users' Forum and Exposition when it comes to a city near you.**

Don't wait till the last minute. Now's the time to make sure your schedule includes a visit to the computer show that has already benefited more than 40,000 computer users in its first two years. Here are some of the details of our updated '74 program.

# THE FORUMS user-to-user in '74

The Computer Users' Forums give you a unique opportunity to exchange information with other users and independent experts about current practical problems. Forums run from 9:00 A.M. to 2:30 P.M. each day, including an opening report, panel discussions, morning and afternoon workshops and luncheon. If you register in advance for the User-to-User Forums, *you'll save $5 per day* from the price at the door. If you attend all three days, *you'll save $15*, just for acting early. (Note that no advance registration is required if you attend the Exposition only).

## Here are the Forum topics for '74

**First Day** — **Source Data Automation Today**
with workshops on
Point-of-sale, Intelligent Terminals,
Optical Scanning and Off-Line Key Entry

**Second Day** — **Data Communications Update**
with workshops on
Network Planning, Front-End Processors,
On-Line Systems and Equipment Selection

**Third Day** — **Operations Management**
with workshops on
Performance Measurement, Project Control,
Multi-Vendor Installations and Small Centers

## Free afternoon sessions

Each day an important, current topic is discussed in an open afternoon session at 2:45 P.M. — free to all Caravan attendees. In 1974 we'll be looking at:

FIRST DAY — Personnel
SECOND DAY — Data Communications
THIRD DAY — Data Base Design

**The Computer Caravan/74** sponsored by **COMPUTERWORLD**

# THE EXPOSITION a business show, not show business

From 10 A.M. to 6 P.M. each day, you'll have a unique chance to see and compare the latest EDP equipment and services in a pleasant, *uncrowded* exhibit hall. You'll see everything from complete systems, to independent peripherals, to software to terminals. And you'll be able to talk specifics about your problems and needs with knowledgeable representatives of leading EDP companies. Because The Caravan has a total of 30 show days in ten cities, no one day is too crowded. The whole Exposition is designed to let you get the facts you want from the people you want to see. And the people you want to see will be there. Here's a partial list of the companies that we'll be keeping on our '74 tour:

*American Telephone & Telegraph Company • Anderson Jacobson, Inc. • Auerbach • BASF Systems • Boeing Computer Services, Inc. • California Computer Products, Inc. • Centronics Data Computer Corporation • Cincinnati Milacron • Complanco, Inc. • Computer Devices, Inc. • Computer Transceiver Systems, Inc. • Control Data Corporation • Cullinane Corporation • Data General Corporation • Decision, Inc. • Delta Data Systems Corporation • Digital Equipment Corporation • Electronic Memories & Magnetics Corporation • General Computer Systems, Inc. • Gould, Inc., Data Systems Division • Hazeltine Corporation • Hewlett-Packard Company • Incoterm Corporation • Interdata, Inc. • Intertel • International Communications Corporation, a Milgo Company • Iomec, Inc. • Lockheed Electronics Company • Modular Computer Systems • MSI Data Corporation • Pansophic Systems, Inc. • Penril Data Communications, Inc. • Pertec Corporation • Prime Computer, Inc. • Quantor Corporation • Raytheon Data Systems • Raytheon Services • Scope Data, Inc. • Shugart Associates • Stromberg DatagraphiX, Inc. • Sycor, Inc. • Texas Instruments, Inc. • University Computing Company • Western Union Data Services Company •*

## Act now

If you'd like to attend The Computers Users' *Forums*, just fill out the registration form and send it in as soon as possible. Remember, advance registration for the Forums saves you $5 per day. If you wish to attend only the *Exposition*, no advance registration is required. Just mark your calendar for the city and dates you want to attend and come to the location indicated in the complete schedule.

## FORUM REGISTRATION USER-TO-USER IN '74

TO: FRANI BLACKLER, THE COMPUTER CARAVAN/'74
797 WASHINGTON STREET, NEWTON, MASS. 02160 (617) 965-5800

Please register me for the forum(s) indicated. I understand that this includes luncheon, workbook and admission to all three days of the Exposition. My check or purchase order is enclosed.
*(No advance registration is required for the Exposition only.)*

**Name** _____

**Title** _____

**Company** _____

**Address** _____

**City** _____

**State** _____ **Zip** _____

☐ First Day — Source Data Automation Today
☐ Second Day — Data Communications Update
☐ Third Day — Operations Management

**Check city**

| | | |
|---|---|---|
| ☐ Cincinnati | Feb. 26-28 | Cincinnati Convention Center |
| ☐ Houston | Mar. 5-7 | Albert Thomas Convention Center |
| ☐ Anaheim | Mar. 19-21 | Anaheim Convention Ctr. South Hall (Exposition) Sheraton Anaheim (Forums) |
| ☐ San Francisco | Mar. 26-28 | Civic Auditorium |
| ☐ St. Louis | Apr. 3-5 | Chase Park Plaza Hotel |
| ☐ Chicago | Apr. 9-11 | Hyatt Regency O'Hare |
| ☐ Boston (Woburn) | Apr. 15-17 | Northeast Trade Center (Rte. 128, Exit 39 or 40) |
| ☐ Charlotte | Apr. 23-25 | Charlotte Convention Center |
| ☐ New York | Apr. 30-May 2 | Americana of New York |

Total number of days registered _____ times $30 - $ _____

☐ *Check enclosed*

☐ *Purchase Order enclosed*

**Registration at the door: $35 per day**
**Advance registration: $30 per day**

*For additional registrations, please copy this form.*

*Please circle one number in each category so that we may better serve you.*

**INDUSTRY**

01 Mining/Construction/Oil & Refining
02 Manufacturing — Computer or data system hardware/peripherals/other associated mechanical devices
03 Manufacturing (other)
04 Utilities/Comm. Sys./Transportation
05 Wholesale/Retail
06 Finance/Insurance/Real Estate
07 DP Serv. Bureau/Software/Planning
08 Business Services (except DP)
09 Education/Medical/Legal
10 Federal, State and Local Government
12 Communications/Printing/Publishing
13 Other _____

**FUNCTION**

01 Corporate Officer
02 Data Processing & Operational Management
03 Data Processing Professional Staff
04 Consultant
05 Lawyer/Accountant
06 Engineering-Management Scientific/R & D
07 Sales/Marketing/Account Executive
08 Librarian/Educator
09 Other _____

# Computers Get Rough Treatment Under Stress Simulation Plan

PHOENIX – In only two hours here recently a new computer was subjected to all the jolts and vibrations of a bumpy 2,000-mile truck ride. Then it was placed in an environmental chamber for five days and exposed to alternate periods of sub-zero temperatures and unbearable levels of high humidity. Finally, it was drip-dried at temperatures equivalent to the scorching heat of the Arizona desert.

When the computer was plugged in after all this, it worked perfectly.

This harsh treatment goes on every week here as part of a special testing program conducted at Honeywell.

The program was started in 1971, and company officials estimate it has saved millions of dollars in damage to computers being shipped to customers.

The "Shipping Stress Simulation Procedure" is credited with helping Honeywell enjoy one of the lowest rates of shipping damage in the DP industry, officials noted.

The process simulates the environment each component goes through from factory to installation. Honeywell computer designers, packaging engineers and others who handle the equipment can see firsthand what a computer faces during shipment.

For instance, early tests showed that some integrated circuits were susceptible to thermal shock and that many electrical connections were affected by condensation. Changes in circuitry and new manufacturing procedures were adopted to overcome these problems.

Simulation of shock and vibrations helped isolate areas where extra insulation, brackets, braces or skin protection were needed.

In one series of tests it was found the wheels on a component, although adequate for normal use, were too weak to sustain some of the shock and vibration limits established.

When the first shipments were made of Honeywell's large Series 6000 computer systems, tests predicted that a certain component might be damaged because of improper placement of straps. The prediction came true when several units were damaged before the strapping procedures could be changed.

Since then, some 70 changes have been made in the design, manufacture and shipping procedures of computers as a result of Honeywell's Shipping Stress Simulation Procedure. Honeywell engineers figure that's a small number compared with the amount of repair jobs that might otherwise be necessary.

## Columbia Adds Core

NEW YORK – The Columbia University Computer Center has added 2M bytes of ECM-75 extended core memory from Ampex Corp. to its IBM 360/75.

The ECM-75s operate at a cycle time of 1.4 μsec, enabling Columbia to run its Call 360 job stream nearly seven times faster than it ran previously in the IBM LCS 2361 memory, according to Ampex.

### Other Orders and Installations

The State of New York Department of Motor Vehicles has installed ZAP, computerized ZIP Code Program, from List Processing Co. Inc., for use on the department's IBM 370/145. By presorting to ZIP Code areas, renewal applications are expected to be delivered a day or two sooner by the U.S. Postal Service.

– – –

First National Bank of Arizona, Phoenix, has ordered a Univac 1110 to update customer transactions.

– – –

Bergen-Brunswig Corp. has ordered an AR-70 from Computer Systems & Education Corp., for use by the company's Scherer Medical and Scientific Co. Division.

– – –

Shop'N'Save, Monroeville, Pa., has installed a Datachecker electronic point-of-sale system from National Semiconductor.

## *Orders & Installations*

## Focus on Other Products Seen

# Pertec Ends Line Printer Production

CW West Coast Bureau

LOS ANGELES – Pertec Corp. has decided not to resume production of its line printer and instead plans to focus on other products, which apparently have booming backlogs.

The announcement to write off the P7330 line came only three weeks after the company had decided to resume production, which had been halted in December pending a review.

The line printer, which was in the 300 line/min category and which was to sell for under $4,000, now appears to be up for sale or for licensing negotiations.

A year-and-a-half of work had gone into the line printer. It was introduced at the June National Computer Conference.

A company spokesman said the printer was terminated to utilize those resources that would have been required to establish volume production and support capability for other company efforts.

Pertec has recently received an $11 million CRT contract from Singer and a $15 million contract for its shared processor from Univac.

Ryal R. Poppa, president and chief executive officer, said net operating income was "adversely affected by prolonged delays of our line printer and continued engineering support and other costs necessary to bring our production capacities into line with anticipated shipments of the shared processor and cathode ray tube terminal."

Poppa also said: "Expected shipments for the tape and disk lines continue as planned with backlogs for these products exceeding our previous forecasts."

"Orders for the shared processor and CRT terminal have raised backlogs to almost double the previous historical high from both a total and committed shipping data standpoint.

"Orders received and scheduled deliveries for the shared processor and CRT terminal were sufficiently delayed, now reducing our profit expectations for the second half of fiscal 1974," Poppa said.

Poppa said the company still expects a profitable second half.

## 'Carnet' Cuts Red Tape Abroad

**NEW YORK – Manufacturers of DP equipment who wish to take samples abroad are increasingly finding relief from tedious customs procedures by the use of the "carnet" system.**

**A "carnet," issued here by the U.S. Council of the International Chamber of Commerce, allows business or professional people to take commercial samples or professional equipment into foreign countries with minimal red tape. The document eases customs clearance saving considerable time, effort and expense.**

**In the first nine months of 1973, according to Meade Brunet, retired vice-president of RCA Corp. and administrator of carnets for the U.S. Council, the value of carnet-covered goods exceeded $16 million, an increase of more than 55% over the same period in 1972.**

## Orders & Installations

Clarksons, British travel agent, has ordered a Univac 90/70 system to implement its real-time reservations system.

– – –

Dearborn Heights, Mich., has ordered an Arcom Mobile Digital Communications System from Atlantic Research Corp., for a pilot program for the police department.

Funded under a grant from the Law Enforcement Assistance Administration, the program will include miniature mobile terminals in 15 of the department's patrol cars.

– – –

Public Service Electric & Gas Co. of New Jersey has ordered an interactive graphic load flow system from Information Displays, Inc. which will allow for electric system planning with on-line flow analysis via remote input to the host computer.

– – –

Westinghouse has installed an Ampex disk file system. This is reportedly the first installation of the DS-330 completely transparent with the IBM 370 Series.

Westinghouse Hanford Co. has purchased a $91,000 direct digital control system from Research, Inc. The system features 256 input signals and will operate three new Source Term Control Loops that are used to develop base technologies in Liquid Metal Fast Breeder Reactor materials and components.

– – –

Gustave Roussy Institute, French cancer research institute, has installed a Univac 1106 for use in patient administration and care and facility administration.

– – –

Huntington Memorial Hospital, Pasadena, Calif., has ordered a Vital hospital management system from Honeywell, Inc. This is the first installation since Honeywell licensed the system from National Data Communications.

– – –

National State Bank of Elizabeth, N.J., has installed a large-scale dual-processor Burroughs B 6700, a B 3500 and four reader-sorters.

– – –

First National Bank of Martinsville and Henry County, Va., has ordered a Century 200 from NCR, to provide Central Information File services to its accounts.

## Position Announcements

**SYSTEMS ANALYST/ PROGRAMMER**

To develop University Management info. system. Financial and Management, Application experience in Personnel, Registration, Admission and Library applications and Programming. PL/1 and RPG desirable. Suburban N.E. location. Should include salary history.

CW Box 4043
797 Washington Street
Newton, Mass. 02160

**GENERAL MANAGER**

To assume full responsibility for operations and marketing in Computer Service Bureau. West Central Wisconsin Location. Must be an aggressive, self-starting individual with managerial background. Experience with NCR Computers and Service Bureau environment preferred but not necessary. Excellent fringe benefit program and salary commensurate with experience.

Send confidential resume, including salary history to:

Dadco Data, Inc.
Box 1107
Eau Claire, WI. 54701

**DATA PROCESSING TRAINING SPECIALIST**

Opportunity presents itself when growth is the key in our D.P. area. Because of this growth we are seeking a specialist who can assist in the training of our D.P. staff, operators, programmers and systems people.

The necessary requirements are:

Must have programming (COBOL 2 years); systems design and analysis experience (from initiation through installation); college graduate; a plus but not essential, would be experience in a classroom teaching or instructing on computers and a knowledge of assembler and IMS.

Consider this opportunity! Call or write:

WASHINGTON NATIONAL INSURANCE COMPANY
1630 CHICAGO AVENUE
EVANSTON, ILLINOIS 60201
Mrs. Knauff (312) 866-7900 Ext. 408
*AN EQUAL OPPORTUNITY EMPLOYER*

VIRGINIA COMMONWEALTH UNIVERSITY

**Position Available**

**Associate Director, University Computer Center**

Applications are solicited for the position of Associate Director, University Computer Center, Virginia Commonwealth University. This is a senior management position which will assume operational management for planning and delivery of computational services to a large urban University and Health Sciences Center. This support of administration, instruction and research is in an I.B.M. 370/VS2 environment. Responses including a detailed resume and reference identifications may be submitted to:

Search Committee, University Computer Center
Virginia Commonwealth University
1015 Floyd Avenue
Richmond, Virginia 23284
*An Equal Opportunity Affirmative Action Employer*

Use Robert Half

for a change

Searching for a competent Financial or Data Processing talent?

Looking for a better position?

ROBERT HALF offers personalized, intensive coverage . . . locally, regionally, nationally or internationally.

ROBERT HALF IS GOOD FOR A CHANGE.

World's Largest
Financial & EDP Personnel Specialists

| | |
|---|---|
| Alexandria, Va., 5001 Seminary Road | (703) 931-3600 |
| Allentown, Hotel Traylor Bldg. | (215) 439-1506 |
| Atlanta, 3379 Peachtree Road N.E. | (404) 233-2416 |
| Baltimore, The Quadrangle–Cross Keys | (301) 323-7770 |
| Boston, 140 Federal St. | (617) 423-6440 |
| Charlotte, 4801 E. Independence Blvd. | (704) 535-3370 |
| Chicago, 333 N. Michigan Ave. | (312) 782-6930 |
| Cincinnati, 606 Terrace Hilton | (513) 621-7711 |
| Cleveland, 1367 E. 6th St. | (216) 621-0670 |
| Dallas, 2001 Bryan Tower | (214) 742-9171 |
| Denver, 1612 Court Place | (303) 244-2925 |
| Detroit, 670 Honeywell Center, Southfield | (313) 354-1535 |
| Hartford, 111 Pearl St. | (203) 278-7170 |
| Houston, 1200 Central Nat'l Bank Bldg. | (713) 228-0056 |
| Indianapolis, 9 North Illinois St. | (317) 636-5441 |
| Kansas City, Mo., 127 West 10th St. | (816) 474-4583 |
| Lancaster, Pa., 8 North Queen St. | (717) 299-5621 |
| Long Island, 420 Jericho Turnpike, Jericho | (516) 822-8080 |
| Los Angeles, 3600 Wilshire Blvd. | (213) 386-6805 |
| Louisville, 680 South 4th St. | (502) 589-6657 |
| Memphis, 12 S. Main St. | (901) 523-8950 |
| Miami, 1190 N.E. 163 St., No. Miami Beach | (305) 947-0684 |
| Milwaukee, 777 East Wisconsin Ave. | (414) 271-9380 |
| Minneapolis, 80 South 8th St. | (612) 336-8636 |
| Newark, 1180 Raymond Blvd. | (201) 623-3661 |
| New York, 330 Madison Ave. | (212) 986-1300 |
| Omaha, 7101 Mercy Road | (402) 397-8107 |
| Orange, Cal., 500 South Main St. | (714) 835-4103 |
| Philadelphia, 2 Penn Center Plaza | (215) 568-4580 |
| Phoenix, 1517 Del Webb TowneHouse | (602) 279-1688 |
| Pittsburgh, Gateway Towers | (412) 471-5946 |
| Portland, Or., 610 S.W. Alder St. | (503) 222-9778 |
| Providence, 400 Turks Head Bldg. | (401) 274-8700 |
| St. Louis, 7733 Forsyth Blvd., Clayton | (314) 727-1535 |
| San Francisco, 111 Pine St. | (415) 434-1900 |
| San Jose, 675 North First St. | (408) 293-9040 |
| Seattle, 1215 Fourth Ave. | (206) 624-9000 |
| Stamford, 111 Prospect St. | (203) 325-4158 |
| Tampa, 1311 N. Westshore Blvd. | (813) 876-4191 |
| Washington, D.C., 7316 Wisconsin N.W. | (301) 652-1960 |
| Wilmington, 1102 West St. | (302) 652-3244 |
| London, England, 17 Finsbury Square | 01-638-4394 |
| Toronto, Canada, 15 Toronto St. | (416) 868-1314 |

ROBERT HALF PERSONNEL AGENCIES

# Disk Drive Spindles

RAYTEE CO. IN CONTINUOUS OPERATION SINCE 1926. LEADING PRODUCER OF SUBSTRATES AND COMPUTER HARDWARE SUCH AS DISC DRIVE SPINDLES. YOUR INQUIRIES ARE MOST WELCOME.

RAYTEE company

Since 1926

761 East Slauson Ave.
Los Angeles, Calif. 90011
Phone (213) 233-4261

# EDP PROFESSIONAL CAREER WEEKEND

COMING SOON
NEW YORK AREA

**PROGRAMMERS SYSTEMS/ANALYSTS**
**PROGRAMMER/ANALYSTS $12-20,000**

Explore the opportunities for EDP Professionals now available . . . meet with personnel interviewers from 15 nationally known corporations to discuss your future. Your resume is evaluated in advance/appointments are scheduled conveniently . . . over a weekend.

To qualify, your background must include one or more of the following:

IBM 360/370 • HONEYWELL 2200 • BURROUGHS 6700
UNIVAC 1100 • SPECTRA 70/45 • NCR CENTURY 100
COBOL and/or BAL • ASSEMBLY LANGUAGE
FORTRAN • PL-1 • RPG

Send your resume, listing your present salary, IMMEDIATELY to insure prompt consideration and to facilitate appointment scheduling . . or call: (413) 733-2232

*Francis & Company*

145 State Street, Springfield, Mass. 01103

Springfield • Chicago • San Francisco • New Orleans

RBF

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

## PROGRAMMER-ANALYST

Outstanding opportunity for individual with 1-2 yrs. exp. Cobol and some systems design. We are a young and well established management and computer consulting firm with a varied clientele in business and government. Initial assignment is in Providence Rhode Island. Willing to travel is a plus. Salary range 10-15,000.

**Send resume to**
**American Data Systems**
**915 Asylum Avenue**
**Hartford, Conn. 06105**

## FIELD ENGINEER

Supervisory Opportunity for a Field Engineer with 3 years + experience in maintenance of computer systems & peripherals.

**Send resumes to W. Leek**
**2401 Morris Avenue**
**Union, N.J. 07083**
**For additional information call**
**(201) 964-8500, ext. 219**
*An Equal Opportunity Employer*

## Programmer Analyst

Involve yourself in the development of student record systems! An opportunity for your own development both on and off the job. Potential involvement in on-line communication systems.

I would like to hear from you because of your experience using BAL or COBOL in IBM 360 or 370 environment. Mark IV a plus!

Ask me about coursework at no cost to you, a 4 day week option, our excellent vacation program, and Minnesota quality of life.

Salary $12,500 and up DOQ.

Please send resume or write for application to:

**Rod Johnson**
**PERSONNEL DEPARTMENT**
**2651 University Ave.**
**St. Paul, Minn. 55114**
**UNIVERSITY OF MINNESOTA**
*an affirmative action employer*

## computer professionals

## there are thousands of computer career opportunities that only we know about.

And you can too! Simply by contacting an ESP Associates Office nearest to you. You'll discover a wealth of opportunities you never knew existed. In your own city . . . or anywhere else, if you want to relocate.

ESP Associates specialized services are professional, confidential, and most effective.

**CLEVELAND**
McCormick & Associates, Inc.
601 Rockwell Avenue
Cleveland, Ohio 44114

**DALLAS**
Data Processing Careers
Suite 1109
Stemmons Tower West
Dallas, Texas 75207

**DETROIT**
Electronic Systems Personnel
1705 Fisher Building
Detroit, Michigan 48202

**HARTFORD**
Compass, Inc.
900 Asylum Avenue
Hartford, Connecticut 06105

**KANSAS CITY**
Electronic Systems Personnel
370 TenMain Center
Kansas City, Missouri 64105

**LOS ANGELES**
Career Data Personnel Agency
Suite 323
3303 Wilshire Boulevard
Los Angeles, California 90010

**MILWAUKEE**
EDP Consultants
11430 W. Bluemound Road
Wauwatosa, Wisconsin 53226

**MINNEAPOLIS/ST. PAUL**
Electronic Systems Personnel
801 Nicollet Mall, Suite 1716
Minneapolis, Minnesota 55402

**PITTSBURGH**
Electronic Systems Personnel
106 Lawyers Building
428 Forbes Avenue
Pittsburgh, Penna. 15219

**SAN FRANCISCO**
The Computer Resources Group
303 Sacramento Street
San Francisco, Cal. 94111

**ST. LOUIS**
Christopher & Long
7777 Bonhomme, Suite 1801
St. Louis, Missouri 63105

**WASHINGTON, D. C.**
ESP Systems Corporation
Suite 704
1211 Connecticut Ave. N.W.
Washington, D. C. 20036

esp associates

## COMPUTER SYSTEMS ANALYST

Expanding 500 bed Medical Center in N.W. Florida desires experienced Analysts with working knowledge of Financial and Medical applications. 1-3 years systems design for 3rd Gen. Hardware required. Must have ability to communicate effectively at all levels with proven record of problem solving. Career positions offer competitive salary-benefits package with real challenge in the dynamic Health Care field. Send resume' including salary, history and requirements to:

**TALLAHASSEE MEMORIAL HOSPITAL**
**PERSONNEL DEPARTMENT**
**TALLAHASSEE, FLORIDA 32303**
*An Equal Opportunity Employer*

## EDP INTERNAL AUDITOR

The Massachusetts Institute of Technology is seeking an individual who will perform EDP auditing. The candidate will perform reviews of the systems development effort, evaluate the internal controls of the system, and post-audit of computer systems. The applicant will develop audit programs, questionnaires, write and present reports.

Applicant must have four years of working experience in EDP, knowledge of COBOL, or P/L1, a degree in Accounting, and public accounting experience.

This position offers a competitive salary and an exc. program of benefits.

**Please send resume to:**
**M.I.T. PERSONNEL OFFICE**
**77 Massachusetts Ave., E19-239, Cambridge, Mass. 02139**
**Attn. Position #74-150**
*An Equal Opportunity Employer M/F*

## CSC

## Marketing Representative and Customer Systems Representatives

Computer Sciences Corporation, the world's largest independent software consulting firm and leader in the field of information sciences, provides the nation's business and scientific communities with remote computing services through its Information Network (INFONET) Division. The acceptance of these services has been highlighted by an achievement of profitable and continuous growth. The result has been rapid expansion creating truly exceptional opportunities for aggressive, dedicated marketing and support personnel in major cities nationwide.

### Marketing Representatives

We are particularly interested if you are presently enjoying success and high earnings selling to the executive level in industry, institutions or government. The product you are selling is less important than knowledge of your customer's informational needs and a basic foundation in data processing or related high-technology industries. Unlimited earnings keyed directly to your successful efforts plus corporate-wide technical assistance and marketing support are assured.

### Customer Systems Representative

We are interested in programmers who are seeking a career in marketing support and eventually marketing. You should have a strong interest in customer service, recent programming experience in FORTRAN on large-scale processors (1108, 360/370, 6600, etc.) and some background in COBOL, BASIC or Data Base Languages (DML, DL/1, etc.).

Current and projected position locations are:

ATLANTA
BOSTON
CHICAGO LOOP/
SUBURBS
CLEVELAND
CONNECTICUT/
WESTCHESTER (N.Y.)
DALLAS
DENVER
DETROIT
HOUSTON
LOS ANGELES
MILWAUKEE
NEW YORK CITY/
LONG ISLAND
PHILADELPHIA
PORTLAND (ORE.)
SAN DIEGO
SAN FRANCISCO/
BAY AREA
SEATTLE
WASHINGTON, D.C.

Individuals (ONLY) are invited to clip this ad, circle the location(s) of interest and mail it with a current resume. All inquiries will be acknowledged promptly and interviews will be conducted in or convenient to your city. Reply to:

Manager, Professional Staffing
Suite 510, Dept. CW-3

COMPUTER SCIENCES CORPORATION
650 North Sepulveda Boulevard
El Segundo, California 90245

**COMPUTER SCIENCES CORPORATION**

*An Equal Opportunity Employer*

## COMPUTER PROFESSIONALS

Our clients are listed expanding upstate New York firms with immediate openings for the following personnel.

**Project Leader . . . . . 17K**
A multi division of large mfg. Co. has created new position due to expansion. Our client offers an except. mgt. opp. 2-3 yrs. solid prog. & systems exper. w/large scale equip. plus deg. and ambition to manage.

**Programmers . . . . . 12-15K**
Our client is one of upstate New York's most sophisticated data centers. 1-3 yrs. large scale equip. Exceptional opp. to mgt. Deg. required.

**Systems/Analyst . . . . . 14K**
Major Rochester N.Y. Co. w/newly installed 370 seeks aggressive analysts w/ 1-2 yrs. financial & mfg. systems exper. deg. required.

Send Resume or Call:

**Career Advisors**
**State Tower Bldg. Suite 901**
**Syracuse, N.Y. 13202**
**(315) 422-2381**

Our client companies assume all fees.

## Marketing Manager— Western Region

### Software Products

IF YOU SCORE ON THIS TEST
YOU'RE THE MAN WE'RE LOOKING FOR!

| | | YES | NO |
|---|---|---|---|
| 1 | Have proven track record selling software products? | ☐ | ☐ |
| 2 | Are Los Angeles based (San Francisco OK too!) and can expand current client base from San Diego to Vancouver? | ☐ | ☐ |
| 3 | Are sensitive to the needs of user management and aware of the tremendous demand in data processing and engineering for better project management and cost control? | ☐ | ☐ |
| 4 | Want substantial compensation (+ expenses, fringes of course) for selling the widely successful project management and cost control system – Project Control/70? | ☐ | ☐ |
| 5 | Are a self-starter, self-manager, intelligent, honest, a good listener, creative, and ambitious? (No, you don't have to be a boy scout too!) | ☐ | ☐ |

If you answered all questions 'YES' and you want more facts, send resume to:

DICK THATCHER

**Atlantic Software Inc.**
Lafayette Building, 5th & Chestnut Sts.
Philadelphia, Pa. 19106 • 215-922-7500

**ADVERTISE IN COMPUTERWORLD**

## HEALTH SCIENCES CENTER SEEKING EXPERIENCED COMPUTER CENTER DIRECTOR

If you possess administrative experience as a director of a computer center, have knowledge of computers and information processing, and are seeking a challenge in the expanding field of health sciences, then you may be interested in applying for a position at the University of Tennessee Health Science Center in Memphis. Current plans for the computer center include the design and implementation of the following automated systems: MIS; CAI; Medical Records; and Scientific Computation. Should have a Masters Degree or its equivalent in education and experience. Inquiries should be addressed to:

**Dr. Samuel Bozeman**
**Executive Assistant to the Chancellor**
**University of Tennessee Medical Units**
**62 S. Dunlap Avenue**
**Memphis, Tennessee 38163**

**AN EQUAL OPPORTUNITY EMPLOYER**

## PROGRAMMERS

A rare opportunity combined with a real challenge.

**Environment: IBM-360/50 DOS**
**Language: ANS Cobol (2 yrs. exp)**
**Application: Insurance**

We are now forming a Data Processing Department and require the services of professionals with the above qualifications. Excellent advancement opportunities, salary, challenges, fringe benefits, and work environment.

After updating some of our existing systems, a Claims Processing System and a General Ledger System are but a few of the projects to be developed.

If a ground floor opportunity and the potential for rapid advancement are what you desire, forward your resume, in confidence, to

**INDEPENDENT LIBERTY LIFE INSURANCE CO.**
126 Ottawa, N.W. Grand Rapids, Michigan 49502
*Attention: M. Stackpoole*
*We are an equal opportunity employer.*

## ENGINEERING PROGRAMMERS

Instron Corporation has an excellent opportunity for Engineering Programmers. Will independently develop programs to fulfill specific requirements in real-time control and data acquisition systems. Will work with Senior Programmers in developing test, control, data acquisition, and diagnostic routines. Will become involved in system installation and operator training, and contribute to future computer systems effort planning.

Instron is a world's leader in the manufacture of sophisticated, mechanical testing systems, which are used to evaluate materials, aerospace structures, automotive vehicles and their components to determine mechanical properties such as strength, durability, and resistance to stress and vibrations. We are a financially sound corporation with a good growth rate and excellent fringe benefits.

The computer group is small, successful, and rapidly growing; the work is interesting, varied and challenging.

Must have a BS in Engineering or the physical sciences. Must have 3-5 years experience in machine language programming of minicomputers for real-time applications. (Experience with PDP-8, PDP-11, Alpha-16 desirable). Background in automated electromechanical instrumentation desirable. Salary negotiable to mid-teens.

**Interested applicants should provide a detailed work history and salary requirements to:**

**Personnel Manager**
**INSTRON CORPORATION**
**2500 Washington Street**
**Canton, Mass. 02021**

*An Equal Opportunity Employer M/F*

INSTRON

## PROGRAMMER/ANALYSTS

**About our company:**

Foremost is the leading national mobile home and recreational vehicle insurer. Our rapid growth is evident:

| | Employees | | Premiums written (in millions) |
|---|---|---|---|
| 12/71 | 792 | 1970 | $ 80.7 |
| 12/72 | 1149 | 1971 | $128.9 |
| 12/73 | 1648 | 1972 | $185.6 |

**About our EDP group:**

At present: IBM 360/40 and 370/145, DOS, COBOL, Mohawk off-line batch processing to regions, multi-programming, project team approach.

Planned for 1974: IBM 370/145 and 370/158, conversion to VS2, ANS COBOL, in-house education department, on-line batch processing, data base manager.

**About Grand Rapids:**

Our modern home office is in western Michigan's largest metropolitan area (population 213,000). Grand Rapids (2½ hrs. from Detroit and Chicago) offers good schools, reasonable housing costs, short commuting distances, year-round recreation, clean air.

**About the job:**

Planned additions to staff include openings for programmer/analysts with a balance of systems and programming experience (2-5 years) on IBM 360 or 370, DOS or OS, COBOL or ANS COBOL. We prefer applications experience in non-manufacturing areas with special interest in accounting, sales and marketing analysis, mortgage or installment loan, insurance claims reporting, insurance premium entry and policy administration, and insurance data base management.

If we sound right for each other, send resume with salary requirements or call collect for further information.

*Foremost®* INSURANCE COMPANY

**C.M. Brown**
**Foremost Insurance Company**
**P.O. Box 2450**
**Grand Rapids, Michigan 49501**
**(616) 942-3236**

*An Equal Opportunity Employer*

## At Roche MIS is an integral part of our progress

**Roche is a leading pharmaceutical and health care company where you will find computer techniques used thoroughly and in many ways. In this environment, your talent finds use and your chance to learn and keep pace with technologies is maximized.**

**Roche salaries are attractive, benefits complete. Facilities are outstanding, and the atmosphere is professional and enjoyable. Please send resume (with Key Letter) that includes salary history information, in confidence to Mrs. P.B. Miller, Associate Employment Manager, CM.**

IN REPLYING, PLEASE PUT THE "KEY LETTER" PLAINLY ON YOUR RESUME TO INDICATE OPENING OF PRINCIPAL INTEREST.

### Staff Programmer/ Analyst

**Plan, design, and implement advanced DP systems, using techniques that fully explore H-635 capabilities. Coordinate the activity of lower level Programmers and Analysts. Data base and programming experience is required that uses high-level COBOL, FORTRAN, IDS. BS or equivalent is called for or equivalent experience in programming/systems under minimum supervision. Key Letter "A."**

### Senior Programmer/Analyst

**Designs, programs, documents, implements and monitors systems; analyzes systems, procedures and methods for simplification improvement.**

**Supervision is not involved. Highly important is ability to define problem (business or research) to be resolved by working with supervisor, project leader, or others, and then designing and programming a system to meet the need. Oral and written communication skills must be excellent. Useful background will include Math or Accounting degree, a few years of COBOL, Assembly Language. (Much work will be at Raritan N.J.; later, mostly at Nutley.) Key Letter "B."**

### Programmer/Analyst

**Design, program, implement and monitor systems in the management information systems area. Heavy COBOL experience in large scale systems is very desirable with several years of Programming and Systems Analysis experience from problem identification to system implementation. Knowledge of disk systems helpful, degree an asset. Key letter "C."**

ROCHE

**Hoffmann-La Roche Inc.**
Nutley, New Jersey 07110
An Equal Opportunity Employer M/F


## *Computerworld Sales Offices*

**Vice President–Marketing:** *Neal Wilder.* **Sales Administrator:** *Dottie Travis.* Computerworld, 797 Washington St., Newton, Mass. 02160. Tel: (617) 965-5800.

**Northern Regional Manager:** *Robert Ziegel.* **Account Manager:** *Mike Burman.* Computerworld, 797 Washington St., Newton, Mass. 02160. Tel: (617) 965-5800.

**Eastern Regional Manager:** *Donald E. Fagan.* **Account Manager:** *Frank Gallo.* Computerworld, Suite 1511, 225 W. 34th St., New York, N.Y. 10001. Tel: (212) 594-5644.

**Los Angeles Area:** *Bob Byrne.* Robert Byrne & Assoc., 1541 Westwood Blvd., Los Angeles, Calif. 90024. Tel: (213) 477-4208.

**San Francisco Area:** *Bill Healey.* Thompson/Healey Assoc., 1111 Hearst Bldg., San Francisco, Calif. 94103. Tel: (415) 362-8547.

**Japan:** *Ken Suzuki.* General Manager, Dempa/Computerworld, 1-11-15 Higashi Gotanda, Shinagawa-ku, Tokyo 141

## POSITION ANNOUNCEMENTS

### Director of Computing Services

- also serves as Administrative Services Manager. Supported by Academic Services Manager and Manager of Computer Operations. Xerox - SIGMA 5 Computer with time-sharing environment. Strong experience in administrative applications. Knowledge of "NCHEMS" helpful. Available July, 1974.

**Send resume to Alfred University**
**Box 842**
**Alfred, N.Y. 14802**
*An Equal Opportunity/ Affirmative Action Employer.*

### SENIOR SYSTEMS ANALYST

**Lincoln, Nebraska**

Experienced candidates are being sought for permanent position of Systems Analyst II for project work in Systems Research and Design. Applicants should have qualifying Data Processing experience including programming and teleprocessing. Primary emphasis of the position will be evaluating current manual systems and the planning, designing and developing of information systems for police agencies. Candidates with exposure to and experience in Law Enforcement and Criminal Justice will be given preference. Send resume to:

**City Personnel Director**
**City-County Building**
**Lincoln, Neb. 68508**

### DATA COMMUNICATIONS SALES

**Two sales positions available; choose between:**
**— Cherry Hill, N.J.**
**(guaranteed salary)**
**— California**
**(guaranteed salary draw)**

National electronics company is rapidly expanding its field sales force in data communications on the east and west coasts. Desire dynamic, aggressive self-starters who enjoy working on their own and specialize in exceeding their projected goals. Experience preferred in selling/leasing data communications (teletypewriter) equipment and related systems and maintenance services. Degree helpful.

**Excellent Commission Plan**
**Outstanding Company Benefits**

Individuals who thrive on sales challenges should send their resumes to: **CW Box 4042**
**797 Washington Street**
**Newton, Mass. 02160**
*An equal opportunity employer M/F*

### V.P. Marketing

- Markettime Corporation needs aggressive executive to increase sales at our two Wall Street Computer Centers.
- Will be responsible for all phases of marketing, operations and expansion.
- Must have strong IBM 360/65 background.
- Attractive salary, incentives, options and benefits.

**Contact Bob Monahan**
**Marketime Corporation**
**One Penn Plaza**
**New York, New York 10001**
**(212) 736-2430**

### SENIOR SYSTEMS ANALYSTS MIDWEST

We have a 5 year plan to put our Data Processing Systems on to an integrated Data Base operation using 370/158's on line entry — IMS-OCR. We are converting from manual and second generation computer design. Management by Objectives is the Corporate philosophy for developing people and implementing IDB.

**SENIOR SYSTEMS ANALYSTS**

We are seeking two senior level analysts — one for our Data Base area and the other for our Corporate area. Requirements: minimum of 5 years experience as a Systems Analyst and Programmer with some practice implementing systems and using COBOL — OS/MVT on IBM equipment. A plus would be exposure to IMS or Data Base. Must be a combination leader, manager, designer and motivator.

We offer excellent salaries commensurate with experience, advancement, great benefits and much more. Send your resume to:

**CW Box 4040**
**797 Washington St., Newton, Mass. 02160**
*AN EQUAL OPPORTUNITY EMPLOYER*

### SYSTEMS-PROGRAMMER DATA SECURITY

Unique opportunity for systems programmer to work in the challenging area of data security. Position involves designing and implementing techniques to penetrate the security measures of interactive data base systems and the design of preventive measures.

The person selected will have several years of systems programming experience, be intimately familiar with operating systems design and data communications. Data security background is desirable.

Firm is located in Northern New Jersey. Highly professional yet relaxed environment. Excellent salary, all benefits. Moderate travel.

**Reply to CW Box 4041**
**797 Washington Street**
**Newton, Mass. 02160**

### SYSTEMS PROGRAMMER OS/MVT/HASP

ACTS COMPUTING CORPORATION is a growing shared resource computing service organization. We have an immediate opening at our corporate computer center in Grand Rapids, Michigan for a systems programmer with HASP/OS internals experience.

As a member of our systems software group you'll participate in the design and implementation of enhancements to our loosely-coupled 370/155 systems. We offer a challenging and stimulating environment, opportunity for solid achievements and an excellent compensation program and fringe benefit package.

Call collect Mr. Paul Hulka at (616) 241-7701 or write to him at:

**ACTS COMPUTING CORPORATION**
**4141 Eastern Ave. S.E.**
**Grand Rapids, Michigan 49508**
(a subsidiary of Lear Siegler, Inc.)
*An Equal Opportunity Employer*

### SUPERVISOR ADP OPERATIONS

**Washington, D.C.**

Position available for supervisor of ADP operations at WSSC, the Bi-County Water and Sewer Agency of Prince George and Montgomery Counties. Position involves the planning, directing, organizing, and coordinating the activities of the Operating Unit, as well as directly supervising a work force of approximately 15 personnel. Successful candidate must have considerable professional experience as operations manager-programming background a plus. Ample fringe benefits, salary commensurate with experience. Interviews to be scheduled after resumes have been submitted stating salary requirements to William H. Krautler.

**WASHINGTON SUBURBAN SANITARY COMMISSION**
**4017 Hamilton Street**
**Hyattsville, Maryland 20781**
*Affirmative Action Employer*

## Buy Sell Swap

### FOR SALE UNIVAC

90 Col. 1004 System
Card Processor,
Interpreter, Sorter
Collator, Reproducer
Panel Boards, Keypunches

**CONTACT: Chuck Bouye**
**American Home Life Insurance Co.**
**400 Kansas Ave.**
**Topeka, Kansas 66603**
**1-913-235-6276**

## BUY SELL SWAP

### WANTED DISK PACK BALANCERS

**Call W.B. Sinclair**
**Precision Methods Inc.**
**8825 Telegraph Road**
**Lorton, Va. 22079**
**(703) 339-7050**

### BUY - SELL - SWAP

**24 - 1130 IBM Disk Packs (2315)**
**2 - Wright Line Storage Cabinet for ten (10) 2315 packs**
**1 - 80 col. 20 drawer Wright Line Cabinet**

EVERYTHING IN EXCELLENT SHAPE
WILL SELL AS PACKAGE OR SEPARATELY

**CALL - Jim Crowe**
**(800) 835-2361**
**ASSOCIATED LABORATORIES, INC.**
**2629 E. Central**
**Wichita, Kansas 67201**

### For Sale

2 — Univac 1050 III's

**System A**

Available December 31, 1973
III Processor/Console
VI-C Tape Drives (6)
Printer
24K Memory

**System - B**

Available January 31, 1974
III
Processor/Console/Typewriter
VI-C
Tape Drives (4) with Synchronizer
90 Column-Reader & Punch
Printer
24K Memory

**Contact: Mr. A. Panariello**
**General Development Corporation**
**1111 South Bayshore Drive**
**Miami, Fla. 33131**
**(305) 350-1211**

### IBM 360/50 CPU FOR LEASE

256K-2Channels-1052

**$3,950/MONTH**

March '74 Thru March 31, '75

Includes Property Taxes

Contact A.W. Kelly

**PULLMAN INCORPORATED**
**1300 Three Greenway Plaza E**
**Houston, Texas 77046**
**(713) 622-6570**

### FOR SALE

Recently acquired
**Telecommunication Time Division Multiplexer System**

Intermix programmable speed to 9,600 baud. System designed as front-end for real time order entry. For full description, pricing and support, call or write:

**Mr. Bob Bartoletta**
930 N. Beltline • Suite 140
Irving, Texas 75061
214/252-7502 • TWX 910-860-5761

vardon & associates, inc.

## BUY SELL SWAP

### MAGNETIC TAPE

| 1600 BPI | recertified | 800 BPI | uncertified |
|---|---|---|---|
| 2400 | $6.00 | | $3.50 |
| 1200 | 5.00 | | 3.00 |
| seals | thinline | | thickline |
| IBM | Memorex | | Scotch |

released from GEOPHYSICAL Archives not work tapes

**(713) 772-5557 C.A.R.D.**
**7575 Bellaire Blvd.**
**Houston, Texas 77036**

### FOR SALE

**8K of core for Honeywell Ssytem**

standard for M-1 or M-3 drawer types.
Controller for Series 200
Card Reader/Punch & Printer

**WANT TO BUY**

**Disk Drives & Controller for Honeywell Series 200**
**Contact Mike Canan**
**206-285-0330**

### BUY...SELL...LEASE IBM 360/370

THE COMPUTER EXCHANGE INC.

In the West: 235 Montgomery St., San Francisco, CA 94104, (415) 788-0600.
In the East: 11 Grace Ave., Great Neck, N.Y. 11021, (516) 466-6500.

MEMBER: COMPUTER DEALERS ASSOCIATION

### We Need: 1419 I

**1442 N1**
**2501 B1**
**1443 N1**

**BUY SELL LEASE**

**FOR BETTER VALUE LOOK TO:**

### Available: IMMEDIATELY

**2—360/30's**
**2 mic systems**
**complete I/O sets**

**cac**

**COMPUTER ACQUISITIONS COMPANY**
P.O. Box 80572 Atlanta, Ga. 30341 (404) 458-4425
Strathmore Office Bldg. Highway 34
Matawan, N.J. 07747 (201) 566-8924

### WHEN BUYING OR SELLING GO GREYHOUND

**FOR SALE**
360/30's, 360/40, and 360/50
Special - System 3 Model 10
1012-1-Tape Punch

**WANTED**
All 370's, 360/65's and 360/50's

**GREYHOUND COMPUTER CORP.**

**Home Office**
Director of Equipment Sales
Greyhound Tower
Phoenix, Arizona 85077
(602) 248-5972

**Dallas Office**
M. Wm. (Bill) Tucker, Jr.
Equipment Sales Manager
7540 LBJ Freeway
Dallas, Texas 75240
(214) 233-1818

### WANTED: Will Buy or Lease

CALCOMP 2314-type Disks & Control Unit.

2501-B2, 1403-N1, 2540-1, 2821 Models 1 & 2

CALL Don Bell
Boothe Computer Corp.
(415) 989-6580

### WE WANT TO BUY Teletype® Model's 28·33·35

**Modems — Couplers — Other Data Communication Equipment**
**WE ALSO SELL THE ABOVE**
**Call or Write:**
**DATA COMMUNICATION EQUIPMENT BROKERS, INC.**
**1900 Thunderbird Street**
**Troy, Michigan 48084**
**(313) 689-2640**

### IBM SYSTEM 370/168 & 158 LEASE PLANS

- **For users wishing to act before March 15, 1974.**
- **Clean "walk away" four year programs.**
- **Lowest cost intermediate and longer term plans.**

**Call: (201) 894-0370**

CFI

**COMPUTER FINDERS INC.**
140 COUNTY ROAD • TENAFLY, NEW JERSEY 07670

BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP

## FOR SALE OR LEASE NCR 735 ALL MODELS

WANTED NCR 31, 32, 33, Comp, -.1, 42, 450, 481, 482, 395, 400, 500

BURROUGHS L Series, TC and Tellers Machines.

Write or Call:
ERVIN FAUBION
Wholesale Data Controls, Inc.
4609 Lewis Road
Stone Mountain Georgia 30083
(404) 934-5650

## For Sale—Burroughs E8491 Data Recording Electronic System

A 149 Key Punch (on line)
Two (2) A 594 Card Readers
A 4002 Auto Ledger Reader
A 988-00 Line Printer
A 131 Card Sorter

Contact Mr. Hughes
Talent Payments, Inc.
7250 Beverly Blvd.
Los Angeles, Calif. 90036
(213) 938-2033

## FOR SALE

LIKE-NEW EQUIPMENT

COMPUTER AUTOMATION ALPHA 16
4K, Operator Panel, Power Supply, Power Fail Option-20 Hours Use.
Costs: $4,000 Price: $2,800

DATA GENERAL NOVA 1220
8K Memory, Teletype I/O
150 Hours Use
Cost: $6,225 Price: $4,700

TELETYPE ASR33
Set up for Use with Nova 1220
100 hours use.
Cost: $1,250 Price: $800

GE TERMINAL, TERMINET 300 KSR
Upper and Lower Case, Transmits and Receives Entire 128 Character ASCII Set, 10, 15 or 30 CPs, RS232B Interface.
Cost: $2,205 Price: $1,300

PERTEC TAPE DECK, MODEL 1807-9
Reels, 800 BPI, Incremental Write, at 0-700 Steps/Sec. New.
Cost: $3,790 Price: $2,500

Contact: Thomas Taplin
TAPLIN BUSINESS MACHINES, INC.
4 Ray Avenue
Burlington, Mass. 01803
(617) 273-2222

## IBM 370/145G LEASE

256K-2 Channels
3215 Console
4 yrs-$11,500 mo.
EXCLUD. MAINT. & TAXES
CW Box 4039
797 Washington St.
Newton, Mass. 02160

## FOR RENT 1402 MOD 1

With Early Card
And Punch Feed Read
3 year lease @$335.00 per month includes 1 shift maintenance.

GLOBAL TABULATING EQUIPMENT CORP.
1229 W. Washington Blvd.
Chicago, Ill. 60607

FOR SALE OR LEASE
IBM
1401 SYSTEMS
with or without
Tape Drives & Disks
Savings in thousands
Member
Computer Dealers Assoc.

D.P. Equipment Marketing Corp.
260 W. Broadway, N.Y. N.Y.
CALL (212) 925-7737 Ext. 1

## Available Immediately IBM 360/65

Half Megabyte Core
2-1403 N1 Printers
2-Channels
Multiplexer
2501 Card Reader

Additional Core or Channels Available

Write or Call

Jewel Co., Inc.
O'Hare Plaza
5725 East River Rd.
Chicago, Ill. 60631
John Weatherman
(312) 693-6000

LEASE BUY SELL
DEAL WITH PROFESSIONALS IN PLACEMENT OF
PRE-OWNED 360/370 EQUIPMENT
"The Nations Largest Wholesale Dealer"
Member Computer Dealers Association
COMPUTER WHOLESALE CORP.
SUITE 441-447 NATIONAL BANK OF COMMERCE (504) 581-7741
NEW ORLEANS, LA. 70112

## New! 1401 SIMULATOR "SIM14" TM

NOW AVAILABLE FOR 360-50-65 USERS

- EXECUTES UNDER BOTH DOS & OS
- SUPPORTS 1401 UNIT RECORD, TAPE AND DISC DEVICES
- JCL AND FILE COMPATIBLE WITH CS30-40
- SELF RELOCATING FOR MULTIPLE PARTITION EXECUTION
- THRUPUT SPEEDS EQUAL TO CS40
- PROVEN PRODUCT BY CUSTOMER USE
- TAKE ADVANTAGE OF 360-50-65 LEASE PRICES WITHOUT HAVING TO REPROGRAM ANY 1401 PROGRAMS

Call or Write
DEARBORN COMPUTER LEASING CORPORATION
Subsidiary of Dearborn-Storm Corporation
4849 No. SCOTT, SCHILLER PARK, ILLINOIS 60176 312 671-4410

BUY SELL LEASE TRADE

370/135 -Available Mid-March
360/50 (128K to 512K, 2 or 3 channels)
2314-A1 - Disc Drive 4 or 8 Spindles
2804-2 - Tape Control Units
360/40, 360/30, 360/20

COMDISCO
2200 E. Devon Ave., Des Plaines, Ill. 60018 • Ph. 312-297-3640 • TWX 910-233-2478
MEMBER: COMPUTER DEALERS ASSOCIATION

## ACS ATTENTION!! 1440 USERS 7335-II TAPES

1403-2 PRINTER
1403-3 PRINTER
1446-1 CONTROL
AVAILABLE NOW

ALSO
1401-12K SYSTEMS
AND
HIGH QUALITY
UNIT RECORD
EQUIPMENT
MEMBER-COMPUTER DEALERS ASSOCIATION

ACS Equipment Corporation
8928 Spring Branch Drive
Houston, Tx 77055
(713) 461-1333

## buy • sell • lease • trade 360/370

dataservequipment inc.
Member Computer Dealers Assoc.
Call Collect ..... 612–546-4422
Or Write ..... 400 Shelard Plaza, Suite 415
Minneapolis, Minnesota 55426

## 360-370 marketplace

BUY • SELL • LEASE

BRANCH OFFICE:
222 E. Wisconsin Ave.
Lake Forest, Ill. 60045
(312) 295-2030

TLW COMPUTER INDUSTRIES INCORPORATED

BRANCH OFFICE:
3031 Tisch Way
Executive Suite 13
San Jose, Calif. 95128
(408) 249-0110

3570 AMERICAN DRIVE • ATLANTA, GEORGIA 30341 • 404/451-1895

## BUY • SELL • LEASE IBM 360/370

370/155J or JI available, with or without IBM Core; Sale or Lease.

3360-3 and 3360-5 available.

360/65 with any number of core boxes and selector channels available now.

IPS
IPS COMPUTER MARKETING CORP.
467 Sylvan Avenue,
Englewood Cliffs,
New Jersey 07632
(201) 871-4200,
TWX (710) 991-9677
"MEMBER COMPUTER DEALERS ASSOCIATION"

## 360 • BUY • SELL • TRADE • 370

• LEASE/SUBLEASE •

AVAILABLE
MOST 360 MODELS

| Printers — Readers — Punches | |
|---|---|
| 1403-N1 | Printers |
| 1403-2 | Printer |
| 2821-1 | Controller |
| 2821-2 | Controller |
| 2540-1 | Reader/Punch |
| 2501-B2 | 1000 CPM Reader |

Disk
2311 — 2314
IBM — CDC — Calcomp

| Tapes | |
|---|---|
| 2404-3 | Control & 90KB Drive |
| 2402-3 | Two 90KB Drives |
| 2401-3 | 90KB Drive |
| 2404-1 | Control & 30KB Drives |
| 2402-1 | Two 30KB Drives |
| 2401-1 | 30KB Drive |
| (7) 2403 | 90KB MA! Drives |
| 3803-1 | Controller |
| (8) 3420-5 | Tape Drives |

| Misc. | |
|---|---|
| 2701-1 | Sync. Data Adapter Feature #7698 |

LUNCEFORD & ASSOCIATES
Valley View Bank Bldg.
Overland Park, Kan. 66212
(913) 381-7272
Member Computer Dealers Assoc.

## 370-155 Available in May

| | Model I | Model J |
|---|---|---|
| 2 Year Lease | 64% (17,523) | 61% (21,063) |
| 3 Year Lease | 59% (16,175) | 56% (19,215) |

NO BROKERS PLEASE

alanthus

Call: Larry Goichman
Alanthus Corporation
(914) 428-3703

BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP

WE
BUY • SELL • RECONDITION
**TELETYPE®**
Machines & Parts
Expert Modem &
Coupler Repair
Call or Write:
**A.D.M. Communications**
1265 Simpson Way
Escondido, Calif. 92025
(714) 747-0374

**AVAIL. IMMED.**
IBM 360/40, Ser. 22072
Model H, 256K
w/3237, 4427, 6980,
6981, 7520, 7920
1052-7
I/O SET ALSO AVAIL.
CALL COLLECT OR WRITE:
**SYSTEMS 70, INC.**
2200 E. Devon Ave.
Des Plaines, Ill. 60018
(312) 827-8135

**DISK PACK CARTRIDGE**
Refurbishing, repair, converting
cannibalizing, recertifying
(any manufacturer's make)
Disk Pack returned with certifier
print out and new disk pack guarantee . . .
SPECIAL OFFER
Freight paid both ways
(during the month of March, 1974)
Call Joseph Constantino
(703) 339-7050
Precision Methods Inc.
8825 Telegraph Road
Lorton, Virginia 22079

**FOR SALE**
**083 SORTERS**
**IBM/MA**
**(203)438-9567**

FAIRFIELD COUNTY
COMPANY SEEKING
SERVICE BUREAU
Guarantee 150/175
Hours Per Month
Weekly or Monthly
Rate Required
CW Box 4045
797 Washington St.
Newton, Mass. 02160

**COMPUTER LEASING OPPORTUNITY**
Well established computer leasing firm offers excellent opportunity in marketing IBM 360/370 computers. Experience with IBM and a third party leasing company desirable. In confidence, please send resume of experience and salary history to:
Datronic Rental Corp.
5210 Wesley Terrace
Chicago, Ill. 60656
(312) 992-0760

**SALE OR LEASE**
360 Systems, 1401 Systems
2400 Tape Drives, 2311 Disk Drives
1620 Systems, 029, 206, 059
All Types Unit Record Equip.
Incl. 082, 083, 402, 407, 514, 519, 557

**EQUIP. WANTED**
360 Systems, 1401 Systems
Tape Drives
All Types Of
Card Equipment
029, 059, 026

**SPECIAL SALE**
360 (30) Sys. I,O, Set | 1620 Disk Sys. 1443 Printer 2311 Disk Drives | 1401-8K 729-Tapes
dpa
- DPA with offices in most major cities now offers IBM equipment completely reconditioned prior to shipment.
- Member Computer Lessors Assn.
- Call or Write

DPA Inc. 2636 Farrington St., Dallas, Texas 75107 (214) 637-0950

**360/20**
SYSTEMS
One with Bi-Synch
Others with Disk & Tape
CMI Corporation
16225 E. Warren Ave.
Detroit, Mich. 48224
(313) 889-0440
CMI Company
408 Bartlet Bldg.
76 University Ave. W.
Windsor, Ontario N9A 5N7
(519) 258-8910
Member
Computer Dealers Association

**COMPUTER EQUIPMENT FOR SALE**
Ontario Hydro has available for sale the following equipment:
2 – Univac 1108-II Processors with Consoles
4 – 65K. Word Memory
2 – Channel Expansion Units
1 – Pagewriter
2 – Weismantel 65K. Word Memory
This equipment is now installed at 620 University Avenue, Toronto and will be available for delivery after July 1, 1974.
For further information, contact Sales Supervisor at 800 Kipling Avenue, Toronto, Ontario, M8Z 5S4.
Phone 416 (area code)
231-4111, local 791
ontario hydro

**FOR SALE**
1. One IBM 2848 Model III (serial 70565) with features 3357, 3859, 5340, 5341, 7928, 4787, 9011, 9902
One IBM 1053 Model IV with 9435 line feeding, six lines per inch and 9104 character spacing, 10 characters per inch PRINT EL DUAL DATA, 115 volts.
Eight IBM 2260 Model I with Alphanumeric Keyboard 115 volts
2. One IBM 2848 Model II (serial 72905) with features 3356, 3858, 3859, 5340, 5341, 7927, 9011, 3901, 9902
One IBM 1053 Model IV with 9435 line feeding, six lines per inch, and 9104 character spacing, 10 characters per inch, PRINT EL MONO DATA, 208 volts.
Eight IBM 2260 Model II Display with 3606 extended cursor control Alphanumeric Keyboard, 115 volts.
Eight IBM 2260 Model II Display with 3605 extended cursor control Alphanumeric Keyboard, 115 volts.

**ALL ITEMS CERTIFIED FOR IBM MAINTENANCE AND AVAILABLE MARCH 15, 1974**
Sealed and separate bids for each of the two units due March 5, 1974, by 4:00 p.m. Central Standard Time. Successful bidders will be notified on March 11, 1974
The Board of Police Commissioners reserves the right to reject any and all bids. The buyer must crate and ship equipment from site. 25% down-payment is required at contract signing, balance at shipment.
Bids are to be forwarded to:
Board of Police Commissioners
1125 Locust Street
Kansas City, Missouri 64106
Attn: Captain Gus Yendrek, Fiscal Division

don't lease!
UNTIL YOU FIND OUT WHY
LEASING FROM
THE FULL-SERVICE COMPANY
IS DIFFERENT....
NOW AVAILABLE
(2) 360-40
WITH I/O SETS
CALL STEVE ELIAS AT (213) 678-0311
OR WRITE TO
CSC
COMPUTER SCIENCES CORPORATION
650 N. SEPULVEDA BOULEVARD
LOS ANGELES, CALIFORNIA 90245
Major Offices and Facilities Throughout the World

**CONTROL DATA**
**CDC 3300 MASTER SYSTEM**
Ideal for Educational Institutions — Hospitals — Scientific environments — with Business Data Processing.
**CDC Peripherals**
**Additional Memory**
Short term lease or sale on extremely Attractive Terms.
Guaranteed Trade In or Upgrade to IBM 370 System.
Computer Systems of America, Inc.
141 Milk Street, Boston, Mass. 02109
(617) 482-4671

**Tape Drive Specialist**
We Buy, Sell and Lease
Used IBM 360 Tape Drives
and Controllers
For more information,
Call or write:
Mr. Harvey N. Berlent
HNB Marketing Co.
3505 Knight Street
Oceanside, N.Y. 11572
(516) 536-8338
*Member, Computer Dealers Assoc.*

SYSTEMS 70 INCORPORATED DATA PROCESSING EQUIPMENT SPECIALISTS
2200 E. Devon Avenue
Des Plaines, Ill. 60018
(312) 827-8135
**360/370**
SYSTEMS 70 INCORPORATED DATA PROCESSING EQUIPMENT SPECIALISTS

**BUY-SELL-LEASE**
**360/20**
360 30/40/50 65
370 145/155
1130
**ECONOCOM**
Subsidiary of Cook Industries Inc.
855 Ridge Lake Blvd.
P.O. Box 171116
Memphis, Tennessee 38117
(901) 767-9130
"MEMBER COMPUTER DEALERS ASSOCIATION"

**URS**
**SYSTEMS FOR SALE**
**UNIVAC**
9200 - 2 Disks $35,000
9200 8K $12,000
9300 16K $30,000
**WANTED**
8414 Disks and Controller
8411 Disks
9300 Tape Drives
**HONEYWELL**
201-2-8 32K RDR-PCH-PTR
$50,000 Shipping And Installation Included
* * * * * * * * * * *
201-1 16K ADV-PROG-Edit
Tape Control-RDR/PCH-CARD RDR
222-4 Printer 132 Positions
* * * * * * * * * * *
316-8K $5,500
* * * * * * * * * * *
**WANTED**
44 KC Tapes and 222-6 Printer
Specialists in Data Processing Equipment • Sales • Service
84 Cummings Park, Woburn, Mass. 01801 — Tel. 617-935-6340 — TWX 710-393-0179

BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP

**TERMS AVAILABLE**

**360/50 I**

**3 Channels Avail Immediately**

**LEASING DYNAMICS INC.**
3101 Euclide Ave.
Cleveland, Ohio 44115
(216) 687-0100
Tom Cutter

---

**NEED URGENTLY WILL PAY TOP CASH PRICES FOR:**

**IBM 029 KEY PUNCHES AND 059 VERIFIERS**

IBM 1440 Computer - IBM 1443 Printer and Data Communications Terminal 3780 EBCD Transmission Code w/additional Positions 144
NCR Scanner 429-739
IBM 088 Model 1 (Transistorized)
IBM Data Converter 3700 & 3701

Phone Collect: Area (313) 584-4300
MICHIGAN SYSTEMS RESEARCH CO.
6661 Schaefer Rd.,
Dearborn, Mich. 48126

---

**IMMEDIATE DELIVERY**
**IBM-Compatible Disk Systems**

**2314-TYPE**

Controller & Four Spindles
Rental: $985/month
Purchase: $28,000
Larger configurations available
Sorbus Maintenance

**tbi®**
TBI Equipment Div.
Time Brokers, Inc.
500 Executive Blvd.
Elmsford, N.Y. 10523
(914) 592-4065

Nationwide broker/dealers of DP equipment & computer time
Boston, Chicago, Elmsford, N.Y., Los Angeles, New York City, Washington, D.C. and San Francisco
Member Computer Dealers Association

---

**BY OWNER**

**360/20 Sub 5**

**16K CPU ONLY WITH**

**2311, 2560, 1403 ATTACHMENTS**

MJM INDUSTRIES
P.O. Box 3293
RIVERSIDE, CA. 92509

---

**COMPUTER RIBBONS FOR SALE**

**Notice:**
**there is a nylon shortage!!!**
**Do Not throw your used computer ribbons away!!!**
**TRADE them in or sell them to us.**
**SAVE**
30% to 60% on ribbon purchases. PMI Cyclefabrix Nylon 1403 Computer Ribbons (not to be confused with just reinking)
**$7.77**
with used 1403 ribbon trade-in (ship your ribbons collect to PMI) PMI will quote on all other makes of ribbons.

**IMMEDIATE DELIVERY**

**call Miss Joan or Miss Penny at (703) 339-7050**

Precision Methods Inc.
8825 Telegraph Road
Lorton, Virginia 22079

---

**FOR LEASE**

**360/50**

**$4,000 MONTH**

**14 Mo. Lease**

-256 K
-1052
-2 Sel. Channels
-Avail. April 1, 1974

J.F. Hughes
Time Sharing Resources, Inc.
777 Northern Boulevard
Great Neck, New York 11022
(516) 487-0101

---

**data sales co.**

BUY • SELL • LEASE

**IBM 360/370**

**SYSTEM 3 MEMORY**

Call or Write
13200 Penn. Ave. So.
Burnsville, Minn. 55337
(612) 890-8838

---

**WANTED**

**USED MAGNETIC TAPE CLEANERS EVALUATERS & CERTIFIERS**

Call Joseph Constantino
Precision Methods, Inc.
8825 Telegraph Road
Lorton, Va. 22079

(703) 339-7050

---

**FOR SALE**

**BURROUGHS L5000**

Purchased one year ago and priced for immediate sale.

LYNCHBURG CHRISTIAN SCHOOLS
701 Thomas Road
Lynchburg, Virginia 24505
Call (804) 239-8130

---

**UNIT RECORD EQUIPMENT AVAILABILITIES**

| TYPE | TYPE | TYPE |
|---|---|---|
| 024 | 087 | 523 |
| 026 | 088 | 548 |
| 056 | 402 | 552 |
| 077 | 403 | 557 |
| 082 | 407 | 602 |
| 083 | 408 | 604 |
| 084 | 514 | |
| 085 | 519 | |

*Special*
*ALL NEW 029*
*$2495 00*

Call us for all your needs, we buy, rent and sell all types of IBM unit record equipment. Over 12 years of serving commercial and government requirements. All equipment rebuilt at our own factory and guaranteed for IBM MAINTENANCE. Contact: John Fennell V.P. for proposal. 212-689-4747 Cable: Leasatron, New York Telex: 423857 LMC U1 116 East 27th Street New York, New York 10016

LMC Data, Inc

---

**FOR SALE OR LEASE**
**IBM 1410 COMPLETE TAPE AND DISK SYSTEM BARGAIN PRICED**
Member Computer Dealers Assoc.

D.P. Equipment Marketing Corp.
260 W. Broadway, N.Y. N.Y.
CALL (212) 925-7737 Ext. 1

---

**Here's the word from ITEL about buying or selling a used IBM 370.**

If you're buying, ITEL can provide the exact configuration you want—when you want it.
(And we won't just quote you a price. We'll quote you a serial number, too.)
If you're selling, we're ready with cash.
Either way, call the Computer Sales Corporation at ITEL.
Dick Hynes at (415) 983-0278,
Rick Becker at (415) 983-0260, or
Fred Hegeman at (415) 983-0410.

155's available...
135's, 145's, 155's and 165's needed.

**ITEL CORPORATION**

One Embarcadero Center, San Francisco, California 94111. Phone (415) 983-0000

---

**SALE/LEASE**

**360/20's**

D2-16K, 1442-5, 2501 A-1 1403-2, D2-16K, 2203 A1, 2560 A1, (2) 2311-11, 2415-1

**SPECIAL SALE**

360/30's, 40's, 50's, with I/O sets. 3360-3 core units, 370-145's, 155's, 1401 C3, 1402-1, 1403-2

**WE WANT TO BUY**

All model 360/20's, 360/30's 40's, 50's, and 65's. 370's and System 3's. All peripherals and unit record equipment.

360/370 & SYSTEM 3

FINANCING AVAILABLE

PHILADELPHIA (215) 568-6620
NEW YORK (516) 487-9812

505 Northern Blvd.
Great Neck, N.Y. 11021

CROSS COMPUTER CORPORATION

---

**Randolph... your neighborhood computer leasing company.**

**With offices in thirteen cities,** Randolph backs up their IBM S/360 and IBM S/370 leases promptly with unique customer support services. For details, call Randolph . . .
your neighborhood computer leasing company.

**Northeast:**
537 Steamboat Road
Greenwich, CT 06830
(203) 661-4200
(212) 931-1177
100 Federal St.
Boston, MA 02110
(617) 434-4043
621 Country Club Road
Avon, CT 06001
(203) 673-0435
20 Cornell Place
Englishtown, NJ 07726
(201) 446-6300

**Mideast:**
6110 Executive Blvd.
Rockville, MD 20852
(301) 770-6266

**Southeast:**
1800 Peachtree Center
230 Peachtree St. NW
Atlanta, GA 30303
(404) 688-6932

**Midwest:**
8050 Hosbrook Rd.
Cincinnati, OH 45236
(513) 793-6060
625 North Michigan Ave.
Chicago, IL 60611
(312) 787-4224

**Southwest:**
1545 W. Mockingbird Lane
Dallas, TX 75235
(214) 637-3680
6440 Hillcroft, Suite 108
Houston, TX 77036
(713) 666-9464

**West:**
One Wilshire Blvd.
Los Angeles, CA 90017
(213) 680-9195
525 University Ave.
Palo Alto, CA 94301
(415) 327-2780
530 "B" Street
San Diego, CA 92101
(714) 232-6401

RCC
**RANDOLPH COMPUTER COMPANY**
*Division of Firstbank Financial Corporation*
A subsidiary of the First National Bank of Boston

---

**AMERICAN USED COMPUTER CORPORATION**

**SAME DAY SHIPMENT (617) 261-1100**

P.O. Box 68, KENMORE STATION, BOSTON, MASSACHUSETTS 02215 TWX: 710-321-6388
member COMPUTER DEALERS ASSOCIATION

**HONEYWELL**

**MEMORY SALE** 105, 110, 115, 120 125, 200, 1200, 1250

**222-6 (1100LPM) PRINTER/BUFFERED**
**172 & 273 DISKS 204B-9 TAPES**

**115/2 TAPE/DISK $79,500**
2 Disks, 4 Tapes, Card I/O, 1100 LPM Printer

**UNIVAC**

**1108 SYSTEM/UNITS**
**SERIES 70 UNITS**
SALE OR RENT

**9300 CARD (16K)**
**9200 CARD (8K-16K)**

**IBM**

**360/20 DISK SYSTEM**

1442 N1 Card Reader/Punch
1443 N1 Printer
1231 N1 Optical Mark Page Rdr.
2703-1 Transmission Control
2311 & 2841 Disks & Control

BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP

**360/40 128K**
**FOR SALE BY OWNER**
Available April 1974
(Principals only, please)
Call or Write:
R.L. Wallquist
**VWR Scientific**
3745 Bayshore Blvd.
Brisbane, Calif. 94005
(415) 469-0100

**FOR SALE OR LEASE 360/30**
Corporate Computers, Inc.
420 Lexington Ave.
New York, N.Y. 10017
(212) 532-1200
Member Computer Dealers Assoc.

**1401**
8K System with (4) 7330's
16K System with (5) 7330's
Available in 30 Days
CMI Corporation
16225 E. Warren Ave.
Detroit, Mich. 48224
(313) 889-0440
CMI Company
408 Bartlet Building
76 University Ave. W.
Windsor, Ont. N9A 5N7
(519) 258-8910
*Member Computer Dealers Association*

Current Inventory
**SALE**
All this Unit Record Equipment in stock and ready to ship at money saving sale or lease prices.
RARELY OFFERED
046, 047, 029, 059, 407, A3, 548, 557, 087, 088
MARK SENSE 519
OTHER FINE MODELS:
024, 026, 056, 077, 085, 402, 403, 407, 514, 519, 523, 552, 602, 604, 521, 826
D.P. Equipment Marketing Corp.
260 W. Broadway, N.Y. N.Y.
(212) 925-7737 Ext. 1

PLEASE OFFER FOR SALE
**(2) 2311 (1) 2841**
IMMEDIATE DELIVERY
**$5,800**
Summit Computer Corp.
480 Morris Avenue
Summit, New Jersey 07901
(201) 273-6900

**BUY•SELL RECONDITION**
New or Used
TELETYPE® MACHINES
&
DATA COM EQUIPMENT
call or write:
(214) 252-7502
TWX 910-860-5761
vardon & associates, inc.
930 N. Beltline, Suite 140
Irving, Texas 75061

**SYSTEM 360/370** | dearborn computer leasing corporation
A business relationship you can't afford to be without . . .
- Lease Terms to Fit Your Needs • Field Engineering Support
- Systems Engineering Support • Well Trained Marketing Staff
- Buy and Sell 360s • Subleasing
- Member, Computer Lessors Association

**Dearborn Computer Leasing Corporation**
a subsidiary of Dearborn-Storm
4849 North Scott Street / Schiller Park, Illinois 60176 Area 312 / 671-4410

**370-145**
**FOR SALE**
3145 C.P.U. (262K)
7844, 6982
3210-Console
**D.P.A. Inc.**
2636 Farrington
Dallas, Texas 75207
(214) 637-0950

For Sale or Lease
**Compu Scan Optical Reader**
complete with:
- Model 172 Page Scanner with recognition logic, on line keyboard, deletion symbol editing, Scan-Edit, Typescan editing, 12K Data General Nova Computer
- High Speed Paper Tape Reader
- BRPE Paper Tape Punch
- Potter Mag Tape Drive (9 track, 800 BPI)
- Automatic Stack Feeder
- Data CRT
- Key-Optics
- Teletype plus interface

Write or call:
Mr. Van, Box 62
New Hampton, N.Y. 10958
(914) 294-6108

**CONNECTICUT CORPORATION**
MUST HAVE OWN MACHINE
**360/30**
**(64K minimum)**
High Speed I/O set
4-2314 disk
3-2401 tapes
PRINCIPALS ONLY
NO BROKERS
Delivery June/July
CW Box 4046
797 Washington St.
Newton, Mass. 02160

**360/370**
**BUY-SELL-LEASE**
Call or Write:
George S. McLaughlin Associates, Inc.
480 Morris Avenue
Summit, N.J. 07901
(201) 273-5700
"member Computer Dealers Association"

Before You Buy — Lease
Sell — 360, 370, 1401
IBM Unit Record Equip.
Please Call or Write
**COMPUTER CLEARING CORPORATION**
5025 N. Central Expressway
Suite 3046 Dallas, Texas 75205
Telephone (214) 528-5087
18 Years Experience, and--
"We guarantee delivery at a fair market price."
George Jachimiec, President

**FOR SALE OR LEASE**
024-$350; 026-$1300; 056-$250;
077-$550; 082-$900; 083-$2300;
085-$1500; 088-$3300; 402-$1300;
403-$1400; 407-$3000; 514-$900;
519-$1500; 548-$2000; 552-$1400;
557-$3700; 602-$400;
2311 (1)-$3300; 729 (4)-$2000;
729 (5)-$2500; 729 (6)-$2000;
1401 System-$14,000
Member
Computer Dealers Association
THOMAS COMPUTER CORP.
600 North McClurg Court
Chicago, Illinois 60611
(312) 944-1401

**MAGNETIC TAPE FOR SALE!!!**
Recertified 100% Guaranteed Trouble Free
1600 BPI 2400 feet
3200 FCI - 9 tack-$4.47
1600 BPI 1200 feet
3200 FCI - 9 track-$3.97
800 BPI 2400 feet
full width tested-$3.47
800 BPI 1200 feet
full width tested-$2.97
Seals or thin line canisters
Call Miss Joan or Miss Penny
(703) 339-7050
Precision Methods Inc.
8825 Telegraph Road
Lorton, Virginia 22079

**DISK PACK CLEANING/ ON SITE**
**$6.13 each, quarterly**
$7.50 Semiannually $8.75 one time
includes filter, thrust bearings, locking spindle, etc.
2316 1316 2315 5440 3336
See below for other benefits included in our service
**NATIONWIDE SERVICE ON GSA SCHEDULE**

**Disk Pack** (3336-2316-1316)
Single Disk Cartridge (2315-5440)
**Cleaning on site**
A. Complete inspection by technically qualified technicians
B. Latest and most accurate inspection instruments used (axial and radial run out)
C. Inspection of all working parts (locking spindle, thrust bearings, hub and cone, etc.)
D. Complete surface analysis of recording disks and cleaning
E. Inspection of index disk
F. Replacement of filter and O-ring
G. Complete inspection and cleaning at customer's location
H. Information recorded on disk packs need not be removed for cleaning and inspection

REPAIR, RECERTIFYING AND REFURBISHING
A. Fully equipped R & R center with certifiers, drives and testing equipment (all repairs performed in clean room environment)
B. All repair work done at the PMI Refurbishing Center in Alexandria, Virginia

**PRECISION METHODS INC.**
PRECISION RESEARCH BLDG.
8825 TELEGRAPH ROAD
LORTON, VIRGINIA 22079
(703) 339-7050 J.W. Constantino

**EQUIPMENT BROKER**
2640 Northaven Road
Dallas, Texas 75229
(214) 241-2576

WE PURCHASE 360/20/30
WE LEASE & SELL 360/20/30
THIS WEEK 360/20
SPECIALS: Bi-Synch
For Sale
029, 059, 083, 084, 026, 557
All 360/20 Systems
SIMPLICITY COMPUTER CORP.
257 W. 39th Street
New York, N.Y. 10018
(212) 695-3010

**Time for Sale**
**NEW JERSEY**

**ACS**
FOR SALE
RARELY-OFFERED
1440-16K
TAPE — DISK
- 7335 II
- 1403 II
- 1412 I

AVAILABLE NOW
ACS Equipment Corporation
8928 Spring Branch Drive
Houston, Tx 77055
(713) 461-1333

we buy and sell
IBM Unit Record Machines
IBM 735 I/O Terminals
NCR 31 - 32 - 33 - 395 - 400,
NCR 480 - 481 - 482 - 450
BURROUGHS - L - SERIES
marion
84 Kennedy St.
Hackensack, N.J.
07601
(201) 343-4554

**360—40**
Computer Time for Sale
All Shifts
128K
8 2314s 4 2402 Mod 2s
1401 Compatibility
2311 Disk compatibility
2 Channels, Floating point decimal arithmetic, Storage Protect, etc.
COME TALK TO US!!
Contact Lee Gruber
1259 Route 46
Parsippany, N.J.
Tel. 263-0060

**OPEN TO BUY MINIS**
DEC-HONEYWELL
Data General
HP-SEL-IBM
Varian Interdata
etc . . .
Available Cash
Large Lots Preferred
(617)261-1100
**AMERICAN USED COMPUTER CORP.**
P.O. Box 68, Kenmore Station
Boston, Mass. 02215
TWX: 710-321-6388
member
COMPUTER DEALERS ASSOCIATION

**BUY SELL LEASE**
370/145 370/155 729's
360/50 1620 360/40
1800 24K Complete System
IBM 370 Cores
Systems and Components
EBM 220 HARVEST AVE
STATEN IS., N.Y. 10310
(212) 273-3636

**IBM 370/135**
Computer Time Available
6-3330 1-1403N1
1-3505 1-3525
Memorex 1603 Microfilm Printer
Telecommunications Capability
Use Your Own System Or
Our DOS-VS RES With
Grasp/VS Spooler
Scratch Packs Available
For Further Information Call:
Jay Pursell or Cliff Johnson
(609) 392-3111 X276 Gould Inc.
Trenton, New Jersey
REASONABLE RATES

TIME FOR SALE | TIME FOR SALE | TIME FOR SALE | SOFTWARE FOR SALE | SOFTWARE FOR SALE

## MASSACHUSETTS

SYSTEMATIC DATA PROCESSING SERVICES, INC.

**IBM 370/155 Data Center**

OS MVT Release 21.7
2 Million Bytes Core Storage
3330 and 2314 Disks
9 and 7-track Magnetic Tape Drives
HASP 3.1 Remote Job Entry
WYLBUR Conversational On-Line System
CCA 204 Conversational On-Line Data Base System
IBM 1288 Page Reader
OPSCAN 100 DM Mark Reader

**Call Sales Dept. 890-1200**
SDP5
400 Totten Pond Road
Waltham, Mass. 02154

## Need Large Blocks of Computer Time? WE HAVE IT!

One of the largest IBM 360/370 systems in New England is ready and waiting for you — as much of it as you need.

We feature:

- Growth capability for any size job through System 360/370 hardware with 2.5 megabytes of high speed storage.
- Ideal if your computer is overloaded.
- OS and DOS System Software, or you can put up system software of your own.
- Extensive tape and disk mass storage.
- Nationwide teleprocessing capabilities, dialup or leased, with software available for remote batch or conversational processing.
- Attractive, secure facilities; conveniently located in Arlington, Massachusetts.

However much time you need, an hour, a day, a week, dedicated or shared, we have it; at attractive rates you can't beat. Contact: J. Keith Lehto at 1-851-4111, Tewksbury, Massachusetts.

WANG COMPUTER SERVICES
(formerly Computer Services)
A Division of Wang Laboratories, Inc.
836 North Street, Tewksbury, Massachusetts 01876 (617) 851-4111

## ILLINOIS

**IBM 360/370 USERS**
Computer Time Available

**370/158** 2 meg, 3 3330 (32m), 3 2314 (24m) 12 3420-5 tape, 2 1403, 3211.
OS/VS2, RJE, IMS, TSO, DOS emul.
24 Hours — 7 Days
CAN YOU BEAT
8.7 cent/sec for a 64K region?

**370/155** 2 meg, 3330 (8m), 2314 (8m), 10 3420-5 tape.

**370/135** 144K, 1 2314, 4 2311, 6 3420-5 tape.

**370/135** 240K, 4 3330's 1 2314, 6 3420-5 Tape.

**360/30** 64K 5 3420-3dd Tape, 4 2311's

FOR FURTHER INFORMATION
CALL RON ELLIS
(312) 346-1331

computer research company
200 N. Michigan Av.
Chicago, Ill. 60601

Largest Computer Time Sales Co.

## QUALITY PRINTING LOW COST

. . . and when you need it. We can pick up your printing needs — overload or special runs — and at prices you'll find hard to resist. Both 1403 and Telex units available.

By the way, we can also help with everything from keypunch to processing on our brand new 370/158—RJE, TSO, etc.

**Call Al Meyerhoff at (312) 325-2102 for details**

**Oak Brook Data Center**
2107 Swift Drive
Oak Brook, Ill. 60521

## NEW YORK

**MARKETIME CORPORATION**
Announces the Opening of its
**360/65 DATA CENTER**
(Wall Street Area)

**PARTITION OR BLOCK TIME**
Immediately Available
1 million K - 13 tapes
12/9 trk. D.D. - 1/7 trk. nl
8/3330 - 1/2540 - 2/1403
7074 emulation
**ALSO AVAILABLE**
7074 & spectra 70/45
Call or Write:
**Marketime Corporation**
1 Penn Plaza
New York, N.Y. 10001
(212) 736-2430

## Software for Sale

**PAYROLL PERSONNEL**
**ACCOUNTS PAYABLE**

Modular, flexible systems with multi-company capabilities. Presently functioning for a variety of users. All programs written in COBOL.

ARGONAUT INFORMATION SYSTEMS, INC.
2140 Shattuck Ave., #203
Berkeley, CA. 94704
(415) 845-7991

HEXCO, inc.

PROVIDES COST-SAVINGS
**SOFTWARE SUPPORT TOOLS**
FOR THOUSANDS OF SUCCESSFUL INSTALLATIONS.
FREE CATALOG
BOX 55588-CS
HOUSTON, TEXAS 77055

## GIPSY

**FOR THOSE TOUGH INFORMATION JOBS**

Iquire To:
GENERAL INFORMATION PROCESSSING SYSTEMS, INC.
2135 Fisher Terrace
Atlanta, Ga. 30345

**PAYROLL PERSONNEL**

Multi-state tax calculations. Unlimited deductions, personnel reports and flexible labor distribution.
Some of the features are:

- Fixed or Variable Input Formats
- Unlimited Earnings and Deductions
- One past Processing
- General Ledger and Labor Distribution Output
- All state taxes and provision for local taxes
- Disc and/or tape versions
- DOS or OS versions from 32K
- IBM, SDS, H-200, RCA Versions
- All COBOL
- Complete Personnel Reporting
- Personnel Action Forms
- Vacation and Sick Leave Accounting
- Skill Code and Education Code

**TRY IT FOR 30 DAYS!**
30 day free trial 40 + USERS
only $960

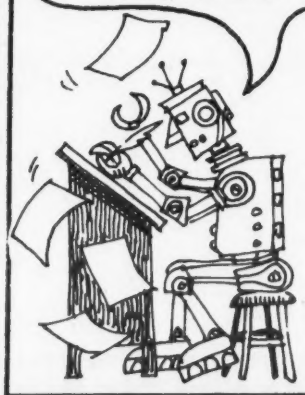
Occidental Computer
805 S. San Fernando Rd.
Burbank, Calif. 91505
(213) 843-2722

## ACCOUNTING SYSTEMS

- Accounts Receivable
- Accounts Payable
- General Ledger
- Fixed Asset
- Sales Analysis
- Report Writer

More than 80 companies are successfully and profitably using these valuable management tools. For immediate information, call collect to the office nearest you.

**INFONATIONAL**
Boston 617/769-5942
Chicago (312) 332-6738
Dallas/Ft. Worth 817/732-6603
Los Angeles 213/383-4191
New York 212/489-1660
San Diego 714/238-1242
1119 Sixth Avenue
San Diego, Ca. 92101



## CATS-A/P
ACCOUNTS PAYABLE
## CATS-A/R
ACCOUNTS RECEIVABLE
## CATS-I/R
INVENTORY RECORDKEEPING

Under control of the CATS MASTER Systems Controller, provided FREE with the license of any of the CATS programs.

For information contact:
Tom Leopard, President

CWI COMPUTERWARES INTERNATIONAL
P.O. Box 31205
Birmingham, Alabama 35222
Phone 205/592-6381

## ACCOUNTING SYSTEMS

PAYROLL
GENERAL LEDGER
ACCOUNTS PAYABLE
INVENTORY
ACCOUNTS RECEIVABLE

IBM SYSTEM/3 USERS
IBM 360-70 USERS
RPG II BAL COBOL

Certified Software Products, Inc.
3140 Harbor Lane North
Minneapolis, Minn. 55441
612 546-6919

## ILLINOIS

## 360/65 OS-MVT-HASP

We will give flat price contracts on jobs regardless of how much running time is involved.

| | | |
|---|---|---|
| HF/II | APT | MPSX |
| ICES | BLISS | CROSSTABS |
| PICS | PAYROLL | SSP |
| MPS | PLAN | SAS |
| | BMD | |

PROJECT II
ACCOUNTS PAYABLE
ACCOUNTS RECEIVABLE
GENERAL LEDGER
General Purpose Simulation System
Continuous System Modeling Program
Urban Transportation Planning System 360

Block Time and Remote Batch
Your Programs or Ours

***USE OUR NETWORK OF BATCH TERMINALS AND 4800 BAUD LEASED LINES CONNECTING THE FOLLOWING CITIES:***

- *CHICAGO*
- *NEW YORK*
- *CLEVELAND*
- *ST. LOUIS*
- *MILWAUKEE*
- *LOS ANGELES*

Stat-Com
A Division of Statistical Tabulating Corp.
(312) 346-7300
Vern Brownworth

## NEW YORK

**Thomas** National, Inc.
1775 Broadway, N.Y.C.

**370/158 DATACENTER**

OS-VS — RJE
And Other Communications
Turnkey Responsibilities
DOS Emulation
3330's and 2314's
Systems and Programming Support
Data Entry Services
Convenient 57th St. Location
Open 24 Hours Per Day
Call (212) 765-8500

## Paymaster Remedies Payroll Problems

- a comprehensive payroll system
- now serving over 1000 companies
- license for as low as $250 a month
- up to 20 customized deductions and/or allowances . . . all with Y-T-D totals
- handles piecework, including calculations of make-up pay
- accepts input from time cards
- accepts input from terminals
- integrated job costing
- labor distribution
- integrates personnel/payroll records
- completely compatible with IBM 360/370 batch and RJE; Honeywell 200/2000; and Burroughs 1700—4700
- available to companies, institutions and service firms under licensing or purchase

COMTECH
*the computer package people*
P.O. Box 784 Reston, Va., 22070
Telephone (703) 471-7141
Canadian payroll package Also Available
Call (416) 492-1480

## AUTOCODER & SPS TRANSLATED AUTOMATICALLY to BAL & PL/1

THE TOTALTRAN SYSTEM

. . . The most economical, practical and quickest method of converting to the 3rd and 4th generation.

**3 SERVICES OFFERED:**

1. 1400 Object to clean source decompilation
2. 1400 Clean source to BAL translation
3. 1400 Clean source to PL/1 translation

Contact: W. Small, President

CPU MANAGEMENT ADVISORY CORP.
853 Broadway, N.Y. 10003
(212) 777-7722

## *McCORMACK & DODGE CORPORATION*

**HAS DEVELOPED MARKETED MAINTAINED**

Accounting-oriented software products over the past five years.
Over 400 companies in the U.S. are using one or more of the following:

Fixed Asset Analysis & Accounting System
Accounts Receivable System
Investment Analysis System
Accounts Payable System

*McCORMACK & DODGE CORPORATION*

One Wells Avenue
Newton, Mass. 02159
(617) 965-3750

# Interdata and Its Earnings Grow

OCEANPORT, N.J. – Interdata, Inc's 1973 earnings jumped 128% to $1.2 million or 61 cents a share from $545,200 or 27 cents a share last year.

Revenues rose 47% from $12.8 million to $18.9 million.

"The company's annualized growth rate in comparison with the same periods in 1972 advanced from 35% in the first quarter to more than 65% in the fourth quarter," President Daniel Sinnott said.

The firm's backlog grew from $4.7 million to $8.4 million during the same period.

"Despite what we recognize as a somewhat uncertain economic environment, in 1974 we plan to accelerate the company's revenue growth rate and to increase our level of profitability well beyond what we were able to achieve in 1973," Sinnott added.

"We will double our plant capacity in 1974," Sinnott pointed out, "to meet the rapidly growing demand for our new series minicomputers such as our recently introduced Model 7/16 and Model 7/32."

Interdata plans to expand both its Monmouth County work force and its field sales/service personnel by more than 50% during 1974.

"Expanded coverage of important markets, significant new products and, indeed, the energy crisis itself have all contributed to a growing demand for sophisticated control systems built around minicomputers," Sinnott added.

Interdata presently employs about 600 in its minicomputer operations at Oceanport.

The company increased its sales, service and support organization by more than 50% in 1973, according to Sinnott, and plans to increase it by 70% in 1974.

"Our new European marketing organization tripled its revenue performance in 1973 in comparison with 1972. And our two new subsidiaries, Interdata of Canada and Interdata of Australia, already have significant backlogs going into 1974."

The company will establish another subsidiary in France in early 1974.

Interdata has sufficient financial resources to continue its rapid growth without the need for additional equity financing in 1974," Sinnott said.

# 2 Lessor Reports on Down Side, But DPF's Earnings Improve

Recent results were mixed in the leasing business, with DPF Inc. reporting increased earnings on decreased revenues; Greyhound Computer Corp. registering a general decline; and Boothe Computer Corp. showing continued, but smaller losses.

DPF reported earnings of $484,000 or 12 cents a share, after special credits, for the six months ended Nov. 30, compared with earnings of $150,000 or 4 cents a share, after special credits, for the year-earlier period.

In both periods, special credits accounted for about half of DPF's earnings.

Revenues for the six months were nearly $16 million compared with $17.6 million for the corresponding period a year earlier.

### 360 Leases

The company derives the bulk of its revenues from System 360 leasing operations and reports the business on a break-even accounting basis.

Chairman Bertram J. Cohn said the average lease term of remarketed equipment as of Nov. 30 was in excess of 24 months. As of the end of the recent period, equipment off-rent and uncommitted to new leases was slightly more than 1%, compared with 3% at the end of the same period last year, he added.

Greyhound earned $2.8 million or 64 cents a share in 1973 compared with $4.1 million or 95 cents a share in 1972.

Revenues were off slightly to $45.6 million from $46.9 million for the prior year.

Fourth quarter earnings declined to $822,000 or 19 cents a share from $901,000 or 21 cents a share in 1972.

Revenues of $12.2 million in the fourth quarter of 1973 were up from $11.3 million in the same period of 1972.

The decline in earnings was attributed primarily to decreases in U.S. computer leasing results, said Olie E. Swanky, Greyhound president.

This more than offset data services results, especially in the UK, and the favorable effect of GCC's acquisition of Bresnahan Computer Corp. in mid-1973, Swanky said.

GCC has completed its acquisition of EDP Resources, Inc., he added.

### Boothe

Boothe Computer cut its losses on decreased revenues in the third quarter and nine months ended Sept. 30.

In the quarter, the company lost $9.3 million or $4.36 a share compared with a loss of $13.6 million or $6.38 a share, after a $3.2 million tax credit, in the same year-ago period.

Revenues declined to $10.6 million from $12.7 million.

In the nine months the loss totaled $11.2 million or $5.26 a share compared with a loss of $12.3 million or $5.80 a share, including over $5 million in tax and special credits, in the corresponding 1972 period.

Revenues were down to $35.2 million from $40.7 million.

Included in the third quarter results was an additional depreciation charge of $5 million due to the continuing erosion in 360 releasing rates, said President D.P. Boothe Jr.

The company improved the off-rent status of its equipment, with about 2% of the 360 portfolio off-rent on Sept. 30, compared with about 5% nine months ago.

Operating losses of Boothe Airside Systems, Inc., PSC Technology, Inc. and Courier Terminal Systems, Inc., including $2.5 million in non-recurring charges, also had an adverse effect on earnings.

# Optical Scanning Profits, Bookings Up

NEWTOWN, Pa. – Optical Scanning Corp. continued the profit trend begun in the first quarter with second quarter earnings of $118,942 or 18 cents a share, including a $56,600 tax credit, compared with a loss of $99,895 or 16 cents a share in the prior year.

Revenues totaled $5.1 million compared with $3.3 million in 1972.

In the six months ended Dec. 31 Optical Scanning earned $150,147 or 23 cents a share, including a $66,600 or 10 cents a share tax credit, while in the same period last year the firm lost $149,856 or 24 cents a share.

Six-month revenues were up also, to $9.4 million from $6.8 million.

Bookings for the first six months are approximately equal to those of all of last year, and President John N. Veale forecast sales of about $19 million dollars for the year.

# Earnings Reports

**STERLING ELECTRONICS**
Three Months Ended Dec. 29

| | 1973 | a1972 |
|---|---|---|
| Shr Ernd | $.13 | $.01 |
| bRevenue | 15,968,507 | 16,044,399 |
| Disc Op | (30,176) | (190,451) |
| Spec Item | c259,000 | d43,051 |
| Earnings | 530,902 | 16,636 |
| 9 Mo Shr | .27 | .04 |
| bRevenue | 45,065,306 | 44,216,322 |
| Disc Op | (6,414) | (269,680) |
| cSpec Cred | 535,300 | 36,935 |
| Earnings | 1,083,855 | 184,705 |

a-Restated to reflect discontinued operations. b-From continuing operations. c-Credit; in 1973, tax benefit; in 1972, tax credit less loss on sale of subsidiary. d-Charge; loss on sale of subsidiary less tax credit.

**DATA PRODUCTS**
Three Months Ended Dec. 29

| | 1973 | a1972 |
|---|---|---|
| Shr Ernd | $.30 | $.07 |
| Revenue | 18,292,000 | 14,314,000 |
| Tax Cred | 746,000 | 169,000 |
| Earnings | 2,033,000 | 452,000 |
| 9 Mo Shr | .82 | .18 |
| Revenue | 54,408,000 | 41,839,000 |
| Tax Cred | 2,355,100 | 494,000 |
| Earnings | 5,587,000 | 1,209,000 |

a-Period ended Dec. 23.

**DATA DOCUMENTS**
Three Months Ended Dec. 31

| | 1973 | 1972 |
|---|---|---|
| Shr Ernd | $1.13 | $.52 |
| Revenue | 10,998,947 | 7,847,588 |
| Earnings | 532,891 | 242,095 |

**UNITED DATA CENTERS**
Nine Months Ended Sept. 30

| | 1973 | 1972 |
|---|---|---|
| Shr Ernd | $.38 | $.26 |
| Revenue | 8,531,085 | 5,858,772 |
| Tax Cred | 224,000 | 160,000 |
| Earnings | 564,143 | 378,792 |

**COMPUTER AUTOMATION**
Three Months Ended Dec. 30

| | 1973 | 1972 |
|---|---|---|
| Shr Ernd | $.24 | $.15 |
| Revenue | 4,248,433 | 2,660,846 |
| Tax Cred | ..... | 18,000 |
| Earnings | 401,632 | 237,736 |
| 6 Mo Shr | .48 | .38 |
| Revenue | 8,153,432 | 4,810,929 |
| Tax Cred | ..... | 183,000 |
| Earnings | 798,412 | 577,907 |

**AUTOMATIC DATA PROCESSING**
Six Months Ended Dec. 31

| | 1973 | a1972 |
|---|---|---|
| Shr Ernd | $.73 | $.60 |
| Revenue | 51,622,000 | 41,780,000 |
| Earnings | 4,503,000 | 3,643,000 |

a-Restated.

**WANG LABORATORIES**
Three Months Ended Dec. 31

| | 1973 | 1972 |
|---|---|---|
| Shr Ernd | $.25 | $.21 |
| Revenue | 14,913,277 | 12,069,939 |
| Earnings | 1,001,596 | 835,381 |
| 6 Mo Shr | .45 | .18 |
| Revenue | 27,824,525 | 20,074,340 |
| Earnings | 1,820,030 | 718,755 |

**SIGNETICS**
Year Ended Dec. 30

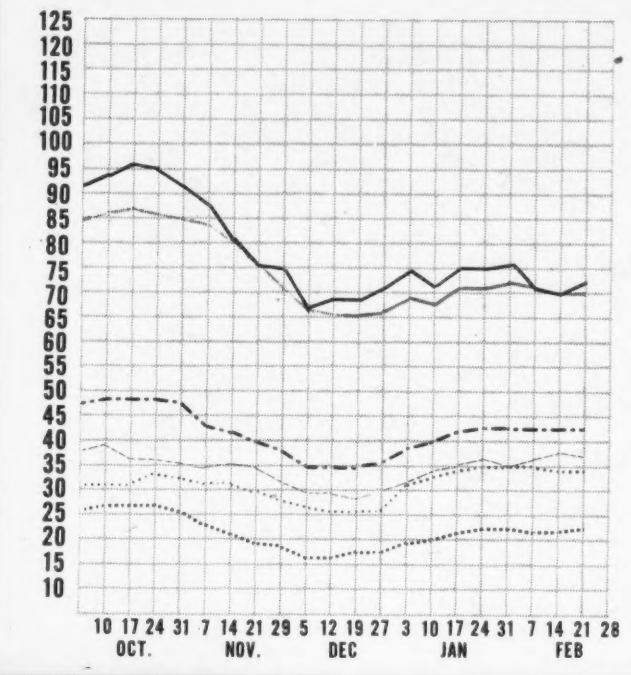
| | 1973 | 1972 |
|---|---|---|
| Shr Ernd | $2.28 | $.40 |
| Revenue | 98,274,000 | 48,428,000 |
| Tax Cred | 4,170,000 | 620,000 |
| Earnings | 10,123,000 | 1,541,000 |
| 3 Mo Shr | .91 | .12 |
| Revenue | 29,930,000 | 14,167,000 |
| Tax Cred | 2,026,000 | 202,000 |
| Earnings | 4,604,000 | 499,000 |

**GRAHAM MAGNETICS**
Six Months Ended Dec. 31

| | 1973 | 1972 |
|---|---|---|
| Shr Ernd | $.64 | a$.59 |
| Revenue | 7,297,065 | 5,366,855 |
| Earnings | 602,368 | 548,376 |

a-Adjusted to reflect a 3% stock dividend in March 1973.

**COMPUTERWORLD Computer Stocks Trading Indexes**








TRADE*QUOTES

# Computerworld Stock Trading Summary

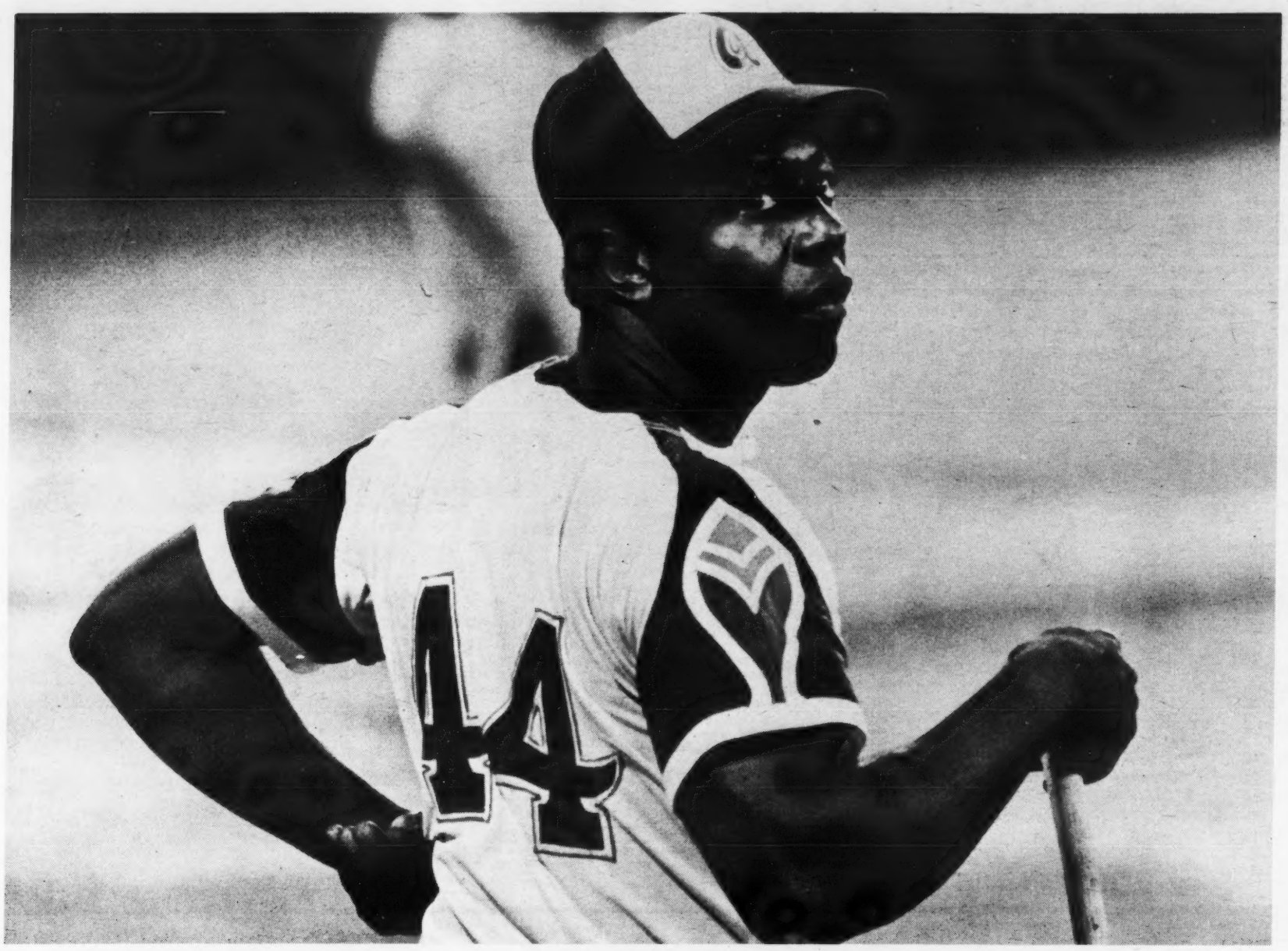
All statistics compiled, computed and formatted by TRADE★QUOTES, INC. Cambridge, Mass. 02139

| EXCH | | 1973-74 RANGE (1) | CLOSE FEB 21 1974 | WEEK NET CHNGE | WEEK PCT CHNGE |
|---|---|---|---|---|---|
| | **COMPUTER SYSTEMS** | | | | |
| N | BURROUGHS CORP | 175-252 | 182 1/8 | +4 1/8 | +2.3 |
| N | COLLINS RADIO | 16- 26 | 24 3/4 | 0 | 0.0 |
| O | COMPUTER AUTOMATION | 5- 20 | 12 3/8 | +3 3/8 | +37.5 |
| N | CONTROL DATA CORP | 31- 62 | 35 3/8 | +1 5/8 | +4.8 |
| N | DATA GENERAL CORP | 28- 49 | 33 5/8 | +5 1/8 | +17.9 |
| O | DATAPOINT CORP | 10- 21 | 13 | +1 | +8.3 |
| O | DIGITAL COMP CONTROL | 2- 6 | 1 7/8 | 0 | 0.0 |
| N | DIGITAL EQUIPMENT | 73-117 | 105 1/2 | +9 7/8 | +10.3 |
| N | ELECTRONIC ASSOC. | 2- 9 | 2 7/8 | + 3/8 | +15.0 |
| A | ELECTRONIC ENGINEER. | 6- 14 | 8 3/8 | 0 | 0.0 |
| N | FOXBORO | 23- 48 | 43 | +4 3/4 | +12.4 |
| O | GENERAL AUTOMATION | 22- 55 | 29 3/4 | -1 1/2 | -4.7 |
| O | GRI COMPUTER CORP | 1- 3 | 3/4 | 0 | 0.0 |
| N | HEWLETT-PACKARD CO | 70- 99 | 76 | +4 3/4 | +6.6 |
| N | HONEYWELL INC | 68-139 | 75 3/8 | +3 5/8 | +5.0 |
| N | IBM | 227-340 | 237 1/2 | +11 | +4.8 |
| O | INTERDATA INC | 7- 14 | 11 5/8 | +1 3/4 | +17.7 |
| O | MICRODATA CORP | 2- 10 | 3 1/8 | - 1/4 | -7.4 |
| N | NCR | 27- 46 | 36 1/4 | +2 5/8 | +7.8 |
| N | RAYTHEON CO | 22- 35 | 35 3/8 | +1 7/8 | +5.5 |
| N | SINGER CO | 35- 74 | 34 7/8 | -1 1/8 | -3.1 |
| N | SPERRY RAND | 36- 56 | 39 | +1 1/8 | +2.9 |
| A | SYSTEMS ENG. LABS | 1- 8 | 1 7/8 | 0 | 0.0 |
| N | TEXAS INSTRUMENTS | 83-138 | 104 1/8 | +10 | +10.6 |
| O | ULTIMACC SYSTEMS INC | 1- 11 | 1 1/4 | - 1/8 | -9.0 |
| N | VARIAN ASSOCIATES | 10- 20 | 10 3/4 | + 1/4 | +2.3 |
| N | WANG LABS. | 13- 34 | 16 1/8 | + 1/2 | +3.1 |
| N | XEROX CORP | 106-169 | 112 1/2 | +6 3/4 | +6.3 |
| | **LEASING COMPANIES** | | | | |
| A | BOOTHF COMPUTER | 1- 5 | 1 1/8 | 0 | 0.0 |
| O | BRESNAHAN COMP. | 1- 2 | 2 | 0 | 0.0 |
| O | COMDISCO INC | 4- 17 | 6 | - 1/4 | -4.0 |
| O | COMMERCE GROUP CORP | 3- 6 | 5 7/8 | 0 | 0.0 |
| O | COMPUTER EXCHANGE | 1- 1 | 1/4 | 0 | 0.0 |
| A | COMPUTER INVSTRS GRP | 2- 8 | 2 7/8 | - 5/8 | -17.8 |
| O | COMP. INSTALLATIONS | 1- 2 | 1/4 | 0 | 0.0 |
| M | DATRONIC RENTAL | 1- 3 | 1 3/4 | 0 | 0.0 |
| A | DCL INC | 0- 3 | 5/8 | 0 | 0.0 |
| A | DEARBORN-STORM | 12- 26 | 16 1/4 | - 7/8 | -5.1 |
| N | DPF INC | 3- 9 | 4 1/4 | + 1/4 | +6.2 |
| O | EDP RESOURCES | 1- 3 | 3 1/4 | 0 | 0.0 |
| A | GRANITE MGT | 2- 6 | 2 7/8 | + 1/8 | +4.5 |
| A | GREYHOUND COMPUTER | 3- 6 | 4 1/2 | 0 | 0.0 |
| A | ITEL | 4- 12 | 4 1/2 | 0 | 0.0 |
| N | LEASCO CORP | 8- 18 | 9 1/8 | + 3/4 | +8.9 |
| O | LEASPAC CORP | 1- 8 | 1 1/4 | + 1/8 | +11.1 |
| O | LFCTRO MGT INC | 1- 2 | 3/8 | 0 | 0.0 |
| O | NRG INC | 3- 15 | 4 | - 1/4 | -5.8 |
| A | PIONEER TEX CORP | 4- 8 | 4 1/4 | + 1/4 | +6.2 |
| A | ROCKWOOD COMPUTER | 1- 3 | 1 | - 1/8 | -11.1 |
| N | U.S. LEASING | 16- 36 | 22 | +1 3/4 | +8.6 |

EXCH: N=NEW YORK; A=AMERICAN; P=PHIL-BALT-WASH
L=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

| EXCH | | 1973-74 RANGE (1) | CLOSE FEB 21 1974 | WEEK NET CHNGE | WEEK PCT CHNGE |
|---|---|---|---|---|---|
| | **SOFTWARE & EDP SERVICES** | | | | |
| O | ADVANCED COMP TECH | 1- 2 | 1 1/8 | - 1/8 | -10.0 |
| A | APPLIED DATA RES. | 2- 4 | 1 7/8 | - 1/8 | -6.2 |
| O | APPLIED LOGIC | 1- 3 | 3/8 | + 1/8 | +50.0 |
| N | AUTOMATIC DATA PROC | 39- 94 | 46 | +3 1/8 | +7.2 |
| O | BRANDON APPLIED SYST | 1- 1 | 3/4 | 0 | 0.0 |
| O | CENTRAL DATA SYSTEMS | 3- 9 | 5 3/4 | 0 | 0.0 |
| O | COMPUTER DIMENSIONS | 1- 5 | 2 1/4 | 0 | 0.0 |
| O | COMPUTER HORIZONS | 1- 6 | 3 3/4 | - 1/4 | -6.2 |
| O | COMPUTER NETWORK | 1- 5 | 2 | + 1/4 | +14.2 |
| N | COMPUTER SCIENCES | 2- 6 | 3 1/2 | + 1/8 | +3.7 |
| O | COMPUTER TASK GROUP | 1- 2 | 5/8 | 0 | 0.0 |
| O | COMPUTER TECHNOLOGY | 1- 3 | 1/2 | 0 | 0.0 |
| O | COMPUTER USAGE | 3- 9 | 3 3/4 | + 1/8 | +3.4 |
| O | COMRESS | 1- 2 | 3/8 | + 1/8 | +50.0 |
| O | COMSHARE | 2- 9 | 3 1/2 | - 1/2 | -12.5 |
| N | CORDURA CORP | 3- 15 | 2 7/8 | 0 | 0.0 |
| O | DATATAB | 1- 4 | 1 3/4 | 0 | 0.0 |
| A | ELECT COMP PROG | 1- 2 | 1/4 | 0 | 0.0 |
| N | ELECTRONIC DATA SYS. | 15- 56 | 16 | +1 | +6.6 |
| O | INFONATIONAL INC | 1- 2 | 1/4 | 0 | 0.0 |
| O | INFORMATICS | 2- 7 | 6 3/4 | 0 | 0.0 |
| O | I.O.A. DATA CORP | 1- 1 | 3/8 | 0 | 0.0 |
| O | IPS COMPUTER MARKET. | 1- 5 | 1 1/4 | 0 | 0.0 |
| O | KEANE ASSOCIATES | 2- 5 | 2 1/2 | 0 | 0.0 |
| O | KEYDATA CORP | 4- 12 | 5 | 0 | 0.0 |
| O | LOGICON | 2- 7 | 3 | 0 | 0.0 |
| A | MANAGEMENT DATA | 1- 5 | 1 3/4 | + 1/4 | +16.6 |
| O | NATIONAL CSS INC | 18- 42 | 30 1/2 | + 1/2 | +1.6 |
| O | NATIONAL COMPUTER CO | 1- 1 | 3/8 | 0 | 0.0 |
| O | NATIONAL INFO SRVCS | 1- 2 | 1/4 | 0 | 0.0 |
| P | ON LINE SYSTEMS INC | 12- 29 | 26 1/2 | + 3/4 | +2.9 |
| N | PLANNING RESEARCH | 2- 7 | 3 3/8 | + 5/8 | +22.7 |
| O | PROGRAMMING METHODS | 17- 25 | 17 | 0 | 0.0 |
| O | PROGRAMMING & SYS | 1- 1 | 3/4 | + 1/8 | +20.0 |
| O | RAPIDATA INC | 3- 24 | 2 1/2 | - 1/8 | -4.7 |
| O | SCIENTIFIC COMPUTERS | 1- 3 | 3/4 | 0 | 0.0 |
| O | SIMPLICITY COMPUTER | 1- 4 | 7/8 | - 1/8 | -12.5 |
| O | TRS COMPUTER CENTERS | 2- 9 | 8 1/2 | 0 | 0.0 |
| O | TCC INC | 1- 1 | 3/8 | 0 | 0.0 |
| O | TYMSHARE INC | 6- 13 | 7 7/8 | + 3/8 | +5.0 |
| O | UNITED DATA CENTER | 3- 6 | 3 1/2 | + 1/4 | +7.6 |
| A | URS SYSTEMS | 2- 8 | 3 | + 1/8 | +4.3 |
| N | WYLY CORP | 3- 11 | 4 | + 1/8 | +3.2 |
| | **PERIPHERALS & SUBSYSTEMS** | | | | |
| N | ADDRESSOGRAPH-MULT | 9- 34 | 9 1/4 | - 5/8 | -6.3 |
| O | ADVANCED MEMORY SYS | 4- 23 | 5 | - 1/2 | -9.0 |
| N | AMPEX CORP | 3- 7 | 4 | - 1/8 | -3.0 |
| O | ANDERSON JACOBSON | 2- 6 | 3 | + 1/4 | +9.0 |
| O | BEEHIVE MEDICAL ELEC | 4- 10 | 5 1/2 | 0 | 0.0 |
| A | BOLT,BERANEK & NEW | 6- 12 | 7 7/8 | - 1/8 | -1.5 |
| N | BUNKER-RAMO | 6- 18 | 6 7/8 | 0 | 0.0 |
| A | CALCOMP | 5- 16 | 9 3/8 | + 7/8 | +10.2 |
| O | CAMBRIDGE MEMORIES | 8- 17 | 11 3/4 | -1 1/4 | -9.6 |
| O | CENTRONICS DATA COMP | 13- 38 | 19 | +1 1/2 | +8.5 |
| O | CODEX CORP | 8- 19 | 10 3/4 | + 1/4 | +2.3 |
| O | COGNITRONICS | 1- 3 | 7/8 | 0 | 0.0 |

| EXCH | | 1973-74 RANGE (1) | CLOSE FEB 21 1974 | WEEK NET CHNGE | WEEK PCT CHNGE |
|---|---|---|---|---|---|
| O | COMPUTER COMMUN. | 1- 4 | 5/8 | 0 | 0.0 |
| A | COMPUTER EQUIPMENT | 1- 3 | 1 5/8 | 0 | 0.0 |
| O | COMPUTER MACHINERY | 4- 13 | 4 1/2 | 0 | 0.0 |
| O | COMPUTER TRANSCEIVER | 1- 6 | 1 1/2 | + 1/8 | +9.0 |
| N | CONRAC CORP | 13- 32 | 16 3/4 | +1 3/4 | +11.6 |
| O | DATA ACCESS SYSTEMS | 1- 3 | 1 3/4 | 0 | 0.0 |
| O | DATA 100 | 9- 19 | 9 7/8 | + 1/4 | +2.5 |
| A | DATA PRODUCTS CORP | 2- 5 | 4 | + 3/8 | +10.3 |
| O | DATA RECOGNITION | 2- 3 | 1/4 | 0 | 0.0 |
| O | DATA TECHNOLOGY | 1- 5 | 3 | + 1/4 | +9.0 |
| O | DECISION DATA COMPUT | 6- 40 | 8 | -1 1/2 | -15.7 |
| O | DELTA DATA SYSTEMS | 1- 1 | 7/8 | - 1/8 | -12.5 |
| O | DI/AN CONTROLS | 1- 4 | 1 1/4 | 0 | 0.0 |
| N | ELECTRONIC M & M | 3- 6 | 3 3/4 | 0 | 0.0 |
| O | FABRI-TEK | 2- 5 | 2 3/4 | + 1/8 | +4.7 |
| O | GENERAL COMPUTER SYS | 3- 9 | 2 1/2 | - 1/2 | -16.6 |
| N | GENERAL ELECTRIC | 54- 76 | 58 | +3 3/4 | +6.9 |
| N | HAZELTINE CORP | 4- 9 | 5 1/2 | + 1/2 | +10.0 |
| O | INFOREX INC | 3- 23 | 2 7/8 | - 3/8 | -11.5 |
| O | INFORMATION DISPLAYS | 1- 2 | 3/8 | 0 | 0.0 |
| O | INFORMATION INTL INC | 8- 15 | 10 1/2 | + 1/2 | +5.0 |
| A | LUNDY ELECTRONICS | 3- 9 | 2 7/8 | 0 | 0.0 |
| O | MANAGEMENT ASSIST | 1- 1 | 3/8 | 0 | 0.0 |
| N | MEMOREX | 2- 19 | 3 3/4 | + 1/8 | +3.4 |
| A | MILGO ELECTRONICS | 14- 28 | 15 1/8 | + 5/8 | +4.3 |
| N | MOHAWK DATA SCI | 2- 13 | 3 3/8 | + 1/4 | +8.0 |
| O | ODEC COMPUTER SYST. | 2- 6 | 2 | 0 | 0.0 |
| O | OPTICAL SCANNING | 2- 8 | 3 1/2 | 0 | 0.0 |
| O | PERTEC CORP | 3- 8 | 3 7/8 | - 1/8 | -3.1 |
| O | PHOTON | 3- 7 | 3 3/4 | 0 | 0.0 |
| A | POTTER INSTRUMENT | 2- 9 | 3 7/8 | - 1/2 | -11.4 |
| O | PRECISION INST. | 2- 6 | 2 1/4 | - 1/4 | -10.0 |
| O | QUANTOR CORP | 4- 10 | 5 1/4 | +1 1/2 | +40.0 |
| O | RECOGNITION EQUIP | 2- 8 | 3 3/4 | - 3/8 | -9.0 |
| N | SANDERS ASSOCIATES | 6- 18 | 6 3/8 | - 1/8 | -1.9 |
| O | SCAN DATA | 1- 6 | 1 3/4 | 0 | 0.0 |
| O | STORAGE TECHNOLOGY | 11- 34 | 12 1/2 | - 1/8 | -0.9 |
| O | SYCOR INC | 9- 20 | 9 1/2 | + 3/4 | +8.5 |
| O | TALLY CORP. | 2- 14 | 3 5/8 | + 1/4 | +7.4 |
| O | TEC INC | 5- 9 | 5 1/2 | 0 | 0.0 |
| N | TEKTRONIX INC | 30- 55 | 35 1/2 | + 7/8 | +2.5 |
| N | TELEX | 3- 8 | 3 | 0 | 0.0 |
| O | WANGCO INC | 7- 13 | 11 1/4 | + 7/8 | +8.4 |
| O | WILTEK INC | 6- 18 | 6 | 0 | 0.0 |
| | **SUPPLIES & ACCESSORIES** | | | | |
| O | BALTIMORE BUS FORMS | 5- 9 | 4 1/2 | - 1/4 | -5.2 |
| A | BARRY WRIGHT | 5- 13 | 5 7/8 | - 1/8 | -2.0 |
| O | CYBERMATICS INC | 1- 3 | 1 1/8 | 0 | 0.0 |
| A | DATA DOCUMENTS | 17- 29 | 29 | + 1/4 | +0.8 |
| O | DUPLEX PRODUCTS INC | 6- 10 | 8 | + 3/8 | +4.9 |
| N | ENNIS BUS. FORMS | 5- 8 | 5 7/8 | + 3/8 | +6.8 |
| O | GRAHAM MAGNETICS | 7- 20 | 7 1/4 | 0 | 0.0 |
| O | GRAPHIC CONTROLS | 7- 12 | 8 3/4 | - 1/4 | -2.7 |
| N | 3M COMPANY | 69- 91 | 73 1/2 | +4 1/2 | +6.5 |
| O | MOORE CORP LTD | 49- 65 | 50 | +1 1/2 | +3.0 |
| N | NASHUA CORP | 36- 58 | 40 3/4 | + 1/8 | +0.3 |
| O | REYNOLDS & REYNOLD | 25- 51 | 25 1/4 | + 1/4 | +1.0 |
| O | STANDARD REGISTER | 11- 20 | 14 1/2 | + 3/4 | +5.4 |
| O | TAB PRODUCTS CO | 7- 23 | 7 | 0 | 0.0 |
| N | UARCO | 15- 23 | 19 | + 1/8 | +0.6 |
| A | WABASH MAGNETICS | 5- 8 | 5 5/8 | - 1/8 | -2.1 |
| N | WALLACE BUS FORMS | 14- 26 | 14 1/8 | + 1/8 | +0.8 |



# MSA SALUTES HENRY AARON

## ONLY THE BEST GO FOR 715
## WE'RE TRYING TO MAKE IT BEFORE HANK

ONLY 2 TO GO!

**AARON 713 HOME RUNS**

**MSA 676 SOFTWARE PACKAGE CUSTOMERS**

ONLY 39 TO GO!

| INNING | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|
| | PAYROLL/ PERSONNEL | GENERAL LEDGER | FIXED ASSET | INVENTORY CONTROL | ACCOUNTS PAYABLE | FINANCIAL REPORTING BANKS | TIME DEPOSITS | INSTALL. LOAN | FINANCIAL REPORTING INSURANCE | |
| USER SCORE | 233 | 127 | 147 | 22 | 57 | 56 | 8 | 17 | 9 | 676 |

DON'T STRIKE OUT – CONSIDER MSA PACKAGES

**MANAGEMENT SCIENCE AMERICA-FIRST IN FINANCIAL SOFTWARE**

MSA'S ALL STAR PACKAGES –THE BEST!

- ☐ MSA Payroll/Personnel
- ☐ MSA General Ledger
- ☐ MSA Fixed Asset Accounting
- ☐ MSA Inventory Control
- ☐ MSA Accounts Payable
- ☐ MSA Financial Information and Control System for Banks
- ☐ MSA Time Deposits
- ☐ MSA Installment Loan
- ☐ MSA Financial Reporting for Insurance Companies

Name

Company Name

Address

City, State Zip

Send To
William M. Graves, Executive Vice President
Management Science America, Inc. 404/262-2376
3445 Peachtree Rd., N.E., Atlanta, Georgia 30326

NEW YORK 201/871-4700 CHICAGO 312/323-5940 LOS ANGELES 213/475-9726